THIRD FIVE-YEAR REVIEW REPORT

Bally Ground Water Contamination Superfund Site

Borough of Bally

Berks County, Pennsylvania

EPA ID#: PAD061105128

Prepared by:

U.S. Environmental Protection Agency

Region III

Philadelphia, Pennsylvania

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Hazardous Site Cleanup Division

6/9/10
Date

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name: Bally Ground Water Contamination Superfund Site		
EPA ID: PAD061105128		
Region: III	**State: PA**	**City/County: Borough of Bally, Berks County**

SITE STATUS	
NPL status: ▶ Final ☐ Deleted ☐ Other (specify)_____	
Remediation Status (choose all that apply): ☐ Under Construction ▶ Operating ▶ Complete	
Multiple OUs?* ▶ YES ☐ NO	**Construction completion date: May 28, 1999 (PCOR)**
Has site been put into reuse? ▶ YES ☐ NO	

REVIEW STATUS	
Lead agency: ▶ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____	
Author name: Mitch Cron	
Author title: Remedial Project Manager	**Author Affiliation: EPA Region III**
Review period: January 2010 – June 2010	
Date(s) of site inspection: April 27, 2010	
Type of review: ▶ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion	
Review number: ☐ 1 (first) ☐ 2 (second) ▶ 3 (third) ☐ Other(specify)_____	
Triggering action: ☐ Actual RA Onsite Construction at OU # _____ ☐ Construction Completion ☐ Other (specify) _____ ☐ Actual RA Start at OU# ▶ Previous Five-Year Review Report	
Triggering action date: June 9, 2005	
Due date (five years after triggering action date): June 9, 2010	

FIVE-YEAR REVIEW SUMMARY FORM, CONT'D.

Issues:

The ground water remedy has been operating for approximately 21 years (1989 – 2010). Current contaminant concentrations at the Site extraction well are similar to 1989 contaminant concentrations, and progress towards achieving the remedial action objective of restoring the contaminated aquifer has been limited. Therefore, optimization of the ground water remedy should be performed.

Recommendations and Follow-up Action:

Optimization of the ground water remedy should be performed.

Protectiveness Statements:

As described in the 2007 Record of Decision Amendment, the Site consists of three operable units (OUs):
OU-1 – Plume of Ground Water Contamination
OU-2 – Bally public water system (which exhibits 1,4-dioxane)
OU-3 – Vapor Intrusion

The remedy at OU-1 is protective of human health and the environment because exposure pathways have been eliminated.

The remedy at OU-2 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

The remedy at OU-3 is protective of human health and the environment because exposure pathways have been eliminated.

Other Comments:

N/A

GPRA Measure Review

As part of this Five Year Review the GPRA Measures have also been reviewed. The GPRA Measures and their status are provided as follows:

Environmental Indicators

Human Health: HEUC
Groundwater Migration: GMUC

Sitewide RAU: The Site is not Site-Wide Ready for Anticipated Use (SWRAU) but is expected to achieve SWRAU when the current on-going remedial action to install an uncontaminated municipal supply well at the Site is complete.

EXECUTIVE SUMMARY

The Bally Ground Water Contamination Superfund Site (Site) is located in Bally, Berks County, PA, and consists of the former Bally Engineered Structures (BES) facility (source of Site contamination), and a plume of ground water contamination present beneath a portion of the Borough of Bally.

The remedy for the Site, as described in the 1989 Record of Decision (ROD), included: abandoning appropriate existing private wells and implementing institutional controls on the use of operable private wells and the construction of new wells; performing ground water and surface water monitoring to measure contaminant concentrations and migrations effected by removing contaminated ground water from the aquifer through the continuous pumping of Municipal Well Number Three (MW#3); treating the extracted ground water by one of the treatment options retained for consideration and discharging the treated water from MW#3 to the adjacent stream or into the Borough of Bally potable water system, as needed, to provide a suitable alternative water supply; and performing necessary additional studies in the pre-design phase to evaluate the configuration of any additional ground water extraction wells required.

The Site achieved construction completion with the signing of the Preliminary Close-Out Report on May 28, 1999. The trigger for this five-year review was the date of the previous Five-Year Review: June 9, 2005 (2005 Five Year Review).

A Site-related hazardous substance (1,4-dioxane) was identified in the Bally public water supply in 2003. A PRP has provided bottled drinking water to users of the Bally public water supply since 1,4-dioxane was identified in the water supply in approximately February/March 2003. Initially bottled drinking water was provided by the PRP voluntarily, and later bottled drinking water was provided pursuant to a September 30, 2003 Administrative Order on Consent between the PRP and EPA. To address the presence of 1,4-dioxane in the Bally public water supply, a ROD Amendment was issued by EPA on August 1, 2007 (2007 ROD Amendment) which required that a new municipal supply well be installed in an area not contaminated by the Site and connected to the public water supply. The 2007 ROD Amendment also separated the Site into three operable units, as follows:

OU-1 – Plume of Ground Water Contamination
OU-2 – Bally public water system (which exhibits 1,4-dioxane)
OU-3 – Vapor Intrusion

The 2010 Five-Year Review found that the remedy was constructed in accordance with the requirements of the 1989 Record of Decision (ROD). Two response actions are currently underway at the Site. A remedial action is being performed pursuant to the 2007 ROD Amendment to install a new municipal supply well for the Bally public water supply. In addition, a removal action is being performed to address vapor intrusion at the former Bally Engineered Structures facility (source of Site contamination), which is being reused as an industrial/business park. The current on-going remedial action and removal action are Potentially Responsible Party

(PRP) lead response actions, and are being performed in accordance with existing enforcement instruments.

Based on the results of the Five-Year Review process, one issue was identified with regard to the selected remedy at the Site: The ground water remedy has been operating for approximately 21 years (1989 – 2010). Current contaminant concentrations at the Site extraction well are similar to 1989 contaminant concentrations, and progress towards achieving the remedial action objective of restoring the contaminated aquifer has been limited. Therefore, optimization of the ground water remedy should be performed.

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Acronyms

AOC	Administrative Order on Consent
BES	Bally Engineered Structures, Inc.
BCC	Bally Case and Cooler Company
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CD	Consent Decree
CEC	Civil and Environmental Consultants, Inc.
CSF	Cancer Slope Factor
DCE	1,1-dichloroethene
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
ERM	Environmental Resources Management, Inc.
ESD	Explanation of Significant Differences
FFS	Focused Feasibility Study
MCL	Maximum Contaminant Level
MW	Monitoring Well
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operations and Maintenance
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RBC	Risk-Based Concentration
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act
TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
VOC	Volatile Organic Compound

U.S. Environmental Protection Agency
Region III
Hazardous Site Cleanup Division
Third Five-Year Review Report
Bally Ground Water Contamination Superfund Site
Borough of Bally, Berks County, Pennsylvania

I. Introduction

The purpose of the Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The United States Environmental Protection Agency (EPA or "the Agency") is preparing this Five-Year Review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121, 42 U.S.C. §9621, and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f) (4) (ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA Region III conducted this Five-Year Review of the remedy implemented at the Bally Ground Water Contamination Superfund Site (Site) located in the Borough of Bally, Berks County, Pennsylvania. This review was conducted by the Remedial Project Manager (RPM) for the Site from January 2010 through June 2010. This report documents the results of the Five-Year Review. This is the third Five-Year Review for the Site. The triggering action for this statutory review is the date of the second Five-Year Review: June 9, 2005. The Five-Year Review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that would allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1 lists the chronology of events for the Site.

Table 1: Chronology of Site Events

Date	Event
October 1982	Volatile organic compound contamination was identified in Bally's Municipal Well Number Three, one of three sources of potable water used by Borough of Bally.
December 1982	Municipal Well Number Three is disconnected from the Bally water system.
1987	EPA enters into a Consent Order with Bally Engineered Structures, a potentially responsible party for the contamination, to perform a remedial investigation/feasibility study.
October 1987/March 1989	PADEP issues a permit for the operation of a two-stage air-stripper water treatment system at Municipal Well Number Three. Municipal Well Number Three is reconnected to the Bally water system.
June 1989	EPA issues the Record of Decision for the Site.
January 18, 1990	EPA issues an Explanation of Significant Differences for the Site, clarifying EPA's position with regard to air emissions from the on-Site air-stripper water treatment system.
July 18, 1991	Consent Decree between EPA and Temrac, Inc. and Sunbeam Oster Company, Inc. entered in Court.
May 28, 1999	EPA issues the Preliminary Close-Out Report for the Site.
February 2003	1,4-dioxane is identified at Municipal Well Number Three and in the Bally public water supply.
March/April 2004	Trichloroethylene vapors are identified beneath the building slab of the former Bally Engineered Structures facility, triggering the initiation of a vapor intrusion investigation at the Site.
August 1, 2007	EPA issued a Record of Decision Amendment (ROD) to address the presence of 1,4-dioxane in the public water supply. The ROD Amendment required the installation of a new municipal supply well, the preparation of a contingency plan, and updating the ground water monitoring program.
October 16, 2008	EPA and a Potentially Responsible Party entered into an Administrative Order on Consent for the performance of a removal action to address vapor intrusion of Site-related hazardous substances into two tenant spaces at the former Bally Engineered Structures facility.
March/April 2009	Construction of a sub slab depressurization (SSD) system,

	performed as part of a removal action to address vapor intrusion at the former Bally Engineered Structures facility, is substantially completed. Air monitoring to determine the efficacy of the SSD in addressing vapor intrusion into two tenant spaces in the former Bally Engineered Structures facility began.
January 2010	Construction of the improvements associated with the new municipal supply well, described in the 2007 ROD Amendment, began.

III. Background

Physical Characteristics

The Site is located in the Borough of Bally, Berks County, Pennsylvania. The Site consists of the former Bally Engineered Structures (BES) facility ("the facility") and a plume of ground water contamination originating from the BES facility and extending underneath a portion of the Borough of Bally ("the plume"). The facility and the plume are further described below.

Facility

The former BES facility was an industrial production plant operated between the 1930's and approximately 1995. After industrial operations were ceased at the facility in approximately 1995, the property and structures were sold and the facility was subdivided for use by small businesses. The facility is currently occupied by various businesses, including light manufacturing, shipping and receiving, self storage, and office work.

Historical operations at the facility are described below (see "History of Contamination").

Ground Water Contamination Plume

The plume consists of ground water exhibiting Site-related contaminant concentrations in excess of the performance goals listed in the Record of Decision (ROD). These performance goals were based on the levels set forth in a Pennsylvania Department of Environmental Protection (PADEP) Municipal Water Supply Permit and Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs). The most contaminated portion of the plume lies between the former BES facility and Bally Municipal Well Number Three (MW#3). The remainder of the plume extends to the southeast, generally following topography and a "stream valley" formed by unnamed tributaries of the West Branch of the Perkiomen Creek ("West Branch"). The portion of the ground water contamination plume that lies to the north of Route 100 (which approximately bisects Bally from east to west) is identified in historical Site documents as the "Northern Area", and the portion of the plume to the south of Route 100 is identified as the "Southern Area".

A map depicting the location of the BES facility is included as Attachment 1. A figure depicting

the location of Site ground water monitoring wells is included as Attachment 2. A figure depicting the extent of the ground water contamination plume, based on the most recent ground water monitoring data for the Site, is included as Attachment 7.

The Site is underlain by a single, thick, unconfined (or locally semi-confined) aquifer that occurs within the limestone fanglomerate and overlying residuum. Transmission of ground water is principally controlled by secondary porosity caused by fractures/joints, and solutioning activity. The direction of ground water flow in the bedrock aquifer is generally to the east.

The aquifer is a current and potential source of drinking water as described below (see "Land and Resource Use").

Land and Resource Use

The former BES facility has been reused and is currently occupied by various businesses, including light manufacturing, shipping and receiving, self storage, and office work.

Land use in the vicinity of the Site is primarily residential, with commercial and industrial properties present, as well as parks, recreation fields and local government facilities. The Borough of Bally covers 330 acres and has a population of approximately 1,062 people.

The aquifer underlying the Site is currently used as a drinking water source for residents in the Borough of Bally and adjoining Washington Township. The drinking water supply for the Borough of Bally and a portion of Washington Township is currently a municipal supply well located inside the Borough limits, and identified as MW#3. MW#3 has been contaminated by the Site-related ground water contamination plume. An air-stripper treatment system ("air-stripper") is currently operated at MW#3 to remove Site-related contaminants from the well water before the water is delivered to residents. The Site-related contaminant "1,4-dioxane", which was identified in the Bally water system during February 2003 (see Section V, below), is not removed by the air-stripper, and is present in the Bally public water supply. To address this condition, bottled drinking water has been provided to users of the Bally public water supply since approximately March 2003. Residents of Washington Township which are not served by MW#3 use private wells. A ROD Amendment was issued by EPA in 2007 to address the presence of 1,4-dioxane in the Bally public water supply. The ROD Amendment required, among other work items, that a new municipal supply well be constructed in an area not impacted by the Site, that the new well be connected to the public water supply, and that MW#3 be disconnected from the public water supply. The remedial action described in the ROD Amendment was initiated in January 2010, and is expected to be completed during 2010.

History of Contamination

In 1982, the Bally Municipal Water Authority conducted a water quality check of the Bally water system and discovered the presence of elevated concentrations of chlorinated volatile organic compounds (VOCs) in MW#3. The principal VOCs identified in the impacted aquifer were 1,1,1-

trichloroethane (1,1,1-TCA), trichloroethylene (TCE), and 1,1-dichloroethene (1,1-DCE). A survey conducted in 1983 by the Pennsylvania Department of Environmental Resources (PADER, now the Pennsylvania Department of Environmental Protection (PADEP)) indicated that the BES facility was a potential source of the VOC contamination.

The former BES facility is located on a tract of approximately 19 acres, immediately to the west/southwest of MW#3. BES operated between 1972 and approximately 1995, constructing insulated structures and structural panels. The predecessor of BES, Bally Case and Cooler Company (BCC), the original owner of the facility, started manufacturing wood products at the facility in the 1930's. In 1950, BCC began manufacturing porcelain-finished, insulated meat display cases and insulated panels. Initially, the insulation material consisted of fiberglass batting, but in the early 1960's urethane foam was substituted. Use of degreasing agents at the BCC facility was concurrent with the switch to urethane foam as the display case insulating material. Degreasing solvents were used to clean metal surfaces to ensure a good bond with the urethane foam insulation, as well as to degrease small metal parts used in interlocking the panels to form insulated structures. Degreasing operations were reportedly performed in two degreasing areas:

- Degreasing of porcelain shells was performed using a 2,000-gallon tank at the "former degreasing area", located in the southeastern portion of the facility. Prior to the application of the porcelain shells and the foam insulation, an overhead monorail crane was used to dip the entire case into the tank. Following dripping, the cases were set on the floor and permitted to dry before being returned to the production line. The only solvent used in the former degreasing area was TCE. Use of this degreasing tank was discontinued in approximately 1969, concurrent with the end of case manufacturing operations.

- A second degreasing area, known as the "small parts degreasing area" was in use in the early 1960's for degreasing small parts used in interlocking the insulated panels. The tank at this location had a capacity of 600 gallons, but facility personnel have indicated that the tank usually contained less than 400 gallons of solvent. There was no reference in the plant operating records to the use of specific degreasing solvents at the small parts degreasing tank prior to 1980.

Additionally, solvents have also historically been used as flushing agents to clean molds and urethane foam injection nozzles between mold shots. This activity had been ongoing since the initial use of urethane foam in the production process in the mid-1960's.

Initial Response

As mentioned above, VOC contamination was identified in MW#3 during October 1982. MW#3 was disconnected from the Bally water system in December 1982. A water treatment system, consisting of two air-stripper towers, was constructed in 1988/1989 to treat water from MW#3, and MW#3 was reconnected to the Bally water system in 1989. Between 1982 and 1989, the Bally water system received water from a second municipal well (identified as "Municipal Well

Number One (MW#1)") and from springs. MW#1 was also contaminated by VOCs between 1982 and 1988. After MW#3 was reconnected to the Bally water system in 1989, MW#1 was removed from service. In addition, the use of springs to obtain water for the Bally water system was discontinued between 1982 and 1989. Therefore, since 1989, the Bally water system has received water exclusively from MW#3.

Additional studies of the aquifer contamination issue were performed in 1983 by PADER and EPA. Although unaware of sources of VOC contamination resulting from their activities, BES met with PADER in 1984 and retained Environmental Resources Management, Inc. (ERM) in 1985 to perform aquifer characterization studies to determine the source of contamination of MW#3. The results of the ERM study, dated October 1986, indicated that the BES plant was a likely source of the VOC contamination noted in the aquifer in the vicinity of the BES facility.

In 1987, EPA entered into a Consent Order with BES, a potentially responsible party (PRP) for contamination at the Site, to conduct a study on the nature and extent of contamination at the Site and to evaluate alternative technologies for cleanup. This study was completed in 1989.

Basis for Taking Action

The Final Phase III Remedial Investigation (RI) Report is dated May 1989. The results of the RI are summarized as follows:

Impacts to Ground Water

The ground water investigation in the RI consisted of the sampling of 18 monitoring wells, two municipal wells, four industrial wells (including the BES well), and 11 residential wells. VOCs were detected in 13 of the monitoring wells, the two municipal wells, three of the industrial wells, and one residential well. Review of the RI report reveals that the shallow portion of the ground water contamination plume, present in unconsolidated subsurface materials, was limited in horizontal extent. The deeper portion of the plume, present in bedrock, was much larger in horizontal extent and exhibited higher concentrations of VOCs. The extent of the deep portion of the plume, as mapped in the RI, extends from the BES facility, to the northeast as far as MW#1, and to the southeast. The downgradient edge of the plume to the southeast is mapped as "inferred", and was not confirmed by sampling and analysis during the RI.

Impacts to Surface Water

Review of the RI reveals that Site-related contaminants were identified in a surface water sample and sediment sample collected from an unnamed tributary located downstream from the former BES facility. The RI report indicated that additional sampling may be necessary to determine if the downstream contamination was a result of the seepage of contaminated ground water. The ROD indicates that the surface water VOC concentrations were found to be below applicable criteria for the protection of aquatic biota.

Sources of contamination at the former BES facility

The RI report included an evaluation of potential contamination source areas at the former BES facility. Soil samples were collected during the RI from the following potential source areas at the facility: former degreasing area, small parts degreasing area, northern and southern lagoon areas, and northern perimeter of the BES facility. Review of the ROD reveals that no specific source of contamination was identified at the former BES facility. It was concluded that the ground water contamination plume associated with the Site is a result of a historic release from the former BES facility.

IV. Remedial Actions

Remedy Selection

1989 ROD

On June 30, 1989, EPA signed the ROD, which documented the selected remedy for the Site. The remedy was comprised of the following components:

- Abandoning appropriate existing private wells and implementing institutional controls on the use of operable private wells and the construction of new wells.
- Performing ground water and surface water monitoring to measure contaminant concentrations and migrations effected by removing contaminated ground water from the aquifer through the continuous pumping of MW#3.
- Treating the extracted ground water by one of the treatment options retained for consideration and discharging the treated water from MW#3 to the adjacent stream or into the Borough of Bally potable water system as needed to provide a suitable alternative water supply.
- Performing necessary additional studies in the pre-design phase to evaluate the configuration of any additional ground water extraction well(s) required.

The remedial action objectives outlined in the ROD for the cleanup of the Site are:

- Prevent current and future ingestion of ground water containing unacceptable levels of VOCs.
- Restore the aquifer within a reasonable time frame to a condition such that levels of the VOC contaminants of concern are below remediation levels consistent with its use as a Class II aquifer.

The performance standards which are to be met by the execution of the remedy at the Site are listed in the ROD. For ground water, the performance standards are based on a PADEP Municipal Water Supply Permit and SDWA MCLs. The performance standards for discharge of treated ground water from the Site air-stripper to surface water are based on a PADEP National

Pollutant Discharge Elimination System (NPDES) permit for the effluent from the air-stripper at MW#3. These performance standards are listed in Table 2 of the ROD (see Attachment #5).

ESD #1

On January 18, 1990, EPA issued an Explanation of Significant Differences (ESD) for the remedy at the Site. The ESD modified the ROD as follows:

- Air emission controls are no longer required irrespective of emission levels. The need for air controls is now dependent upon contaminant levels emitted from the air-stripper. Specifically, air emissions must be controlled such that the combined emissions from all Site-related air-strippers shall not exceed three pounds per hour during any one hour and fifteen pounds per day during any twenty-four hour period.
- Air stripping without air emission controls (ROD process option 2C) may be retained for consideration if, and only if the combined emissions from all site-related air-strippers do not exceed the levels stated in the previous paragraph.
- EPA reserves the right to determine the appropriate number of Site recovery wells and the appropriate design and location for all recovery wells. EPA will also control the withdrawal pumping rate of these wells. The emissions generated under the EPA approved design and operating specifications will in turn dictate the need for air emission controls.

Administrative Order on Consent – 1,4-Dioxane

As mentioned above, the Site-related contaminant 1,4-dioxane was identified in the Bally public water supply during February 2003. To address this condition, EPA and a PRP entered into an Administrative Order on Consent (AOC) on September 30, 2003. The AOC required, among other work items, that the PRP prepare a Focused Feasibility Study to address the presence of 1,4-dioxane in the Bally public water supply, and that users of the Bally public water supply be provided with bottled drinking water. Bottled drinking water will be provided to users of the Bally public water supply until the remedy selected by EPA (see discussion below, "ROD Amendment") to address 1,4-dioxane in the water supply has been implemented.

ROD Amendment

EPA issued a Record of Decision Amendment (ROD Amendment) on August 1, 2007. The ROD Amendment was issued to address the presence of 1,4-dioxane in the Bally public water supply, a Site-related hazardous substance. The selected remedy in the ROD Amendment consisted of installation of a new municipal supply well in a location not impacted by the Site, and connection of the new well to the Bally public water supply; disconnection of MW#3 from the public water supply; and preparation of a contingency plan and ground water monitoring program to prevent the Site-related ground water contamination plume from impacting the new municipal supply well, and mitigate impacts to local domestic wells from operation of the new municipal supply well.

Administrative Order on Consent – Vapor Intrusion

Between approximately 2004 and 2007, an investigation of vapor intrusion was performed at the Site. The investigation was performed at the former Bally Engineered Structures facility (source of Site contamination) and at townhome properties that lie between the former Bally Engineered Structures facility and MW#3, and are underlain by the most contaminated portion of the Site-related ground water contamination plume. It was determined by EPA in 2005 that no further action was necessary to address vapor intrusion at the townhome properties investigated. However, it was determined that vapor intrusion was occurring into two tenant spaces at the former BES facility at levels of potential concern. On October 16, 2008 EPA and a PRP entered into an Administrative Order on Consent (AOC) to address vapor intrusion at the Site. The 2008 AOC included specific work items to address vapor intrusion at the former BES facility as part of a PRP-led removal action. One of the main tasks included in the AOC was design, construction, and operation of a mitigation system to reduce indoor air concentrations of Site-related hazardous substances at the tenant spaces.

Remedy Implementation

Well Abandonment

Review of the ROD reveals that a private well required abandonment. This well exhibited a total VOC concentration of 304 parts per billion (ppb) during the RI. During the performance of the 2005 Five-Year Review, EPA performed an interview with Civil and Environmental Consultants, Inc. (CEC), a consultant for the PRP. The CEC project manager indicated that to the best of his knowledge, the private well referenced in the ROD was not permanently closed as part of the remedial action at the Site. Therefore, as part of the 2005 Five Year Review, EPA concluded that the PRP should arrange for the closure of the private well in accordance with appropriate State requirements. The well was closed on March 7, 2006. Well closure documents for this well are included as Attachment 6 to this Five Year Review Report.

Institutional Controls

The Borough of Bally passed an ordinance (November 4, 2002, Ordinance #250 – Water & Sewer) which serves as an institutional control at the Site. Review of the ordinance reveals that all water users located in the Borough of Bally (residential and non-residential), and situated so that water service is available, must connect to the Bally water system. In addition the ordinance indicates that no private wells may be drilled in the Borough without applying for a permit from the Borough of Bally. The permit application would be reviewed by the Borough Engineer in cooperation with PADEP. The ordinance specifically indicates that a permit for a new private well in Bally will not be issued if it is determined that the installation of such a well would adversely impact the remedial action being performed at the Site.

Ground water extraction and treatment

In the interim period between the discovery of the VOC contamination at MW#3 (1982) and the issuance of the ROD (June 1989), the PRP arranged for the installation of an air-stripper at MW#3. The air-stripper was installed so that Site-related VOCs could be removed from contaminated well water prior to distribution in the Bally water system. The first air-stripper tower received a Public Water Supply Permit (No. 0687505) to operate from PADEP on October 28, 1987. The second air-stripper tower received an amendment to the Public Water Supply Permit to operate from PADEP on March 24, 1989.

Selection of additional extraction wells/Ground water and surface water monitoring

EPA entered into a Consent Decree (CD) with Temrac, Inc. and Sunbeam-Oster Company, Inc. (PRPs) to implement the requirements of the 1989 ROD. The CD was entered into the court on July 18, 1991. As the air-stripper at MW#3 was constructed before the issuance of the ROD, the primary activity to be addressed during the remedial design (RD) process was the determination of whether or not additional extraction wells would be required to address the ground water contamination plume.

A Pre-Design Report (dated June 6, 1994) was prepared to evaluate, among other things, the necessity of installation of additional extraction wells south of Route 100. The Pre-Design Report indicated that the existing remedial system, comprised of MW#3 pumping at 260 gallons per minute and an air-stripper, did not capture contaminated ground water south of monitoring well "87-10" (see Attachment 2). As potential receptors (private wells) existed downgradient from the ground water contamination plume that could be impacted in the future, the Pre-Design Report concluded that additional remedial actions south of Route 100 needed to be considered to achieve the goals presented in the ROD. The Pre-Design Report included a preferred method for cleanup of the portion of the ground water contamination plume present south of Route 100, known as the "Southern Area". The preferred method was comprised of the installation of two extraction wells and ground water treatment systems at locations south of Route 100.

Based on a review of EPA records for the Site, the installation of one extraction well on a privately owned property located south of Route 100 was proposed in 1995. The location of this proposed extraction well was believed to be at the downgradient edge of the plume. However, access to the necessary private property does not appear to have been accomplished until August 1998.

In the interim period between 1995 and 1998, PRPs performed monitoring of ground water and surface water in the Southern Area of the ground water contamination plume. Based on the results of this monitoring, PRPs made the following assertions regarding the Southern Area of the plume:

- Although contaminant concentrations in the shallow portion of the bedrock aquifer continued to exceed the performance standards for ground water listed in the ROD, overall

contaminant concentrations in the shallow bedrock aquifer were decreasing.

- Contaminant concentrations in the deep portion of the bedrock aquifer were less than the performance standards listed in the ROD. Therefore cleanup of the deep portion of the bedrock aquifer had been accomplished.
- The nearest downgradient receptor, a privately owned well used for potable water and watering animals was not impacted by Site-related contaminants.
- Samples of surface water revealed concentrations of Site-related contaminants that exceeded the performance standards listed in the ROD. However, the contaminant concentrations were determined to be less than Risk-Based Concentrations (RBCs) that were calculated for the Site. The RBCs were based on exposure from incidental ingestion and dermal absorption during swimming, which were considered to be the most likely routes of exposure. Based on this information, the concentrations of Site-related contaminants identified in surface water were not considered to represent a threat to human health.
- The continuous pumping of MW#3 had created a ground water capture zone that included the former BES facility, the source of the ground water contamination. This ground water capture zone extended to approximately Route 100, and had effectively separated the Southern Area of the plume from the Northern Area of the plume. Based on this separation of the Southern Area from the source of contamination, it was expected that the Southern Area portion of the plume would achieve compliance with the ground water performance standards without the installation of an active ground water remediation system. The cleanup of the Southern Area of the plume would be effected by natural processes, such as dilution and adsorption.

The above-listed assertions regarding the Southern Area of the plume notwithstanding, when the above-mentioned access issue had been resolved in August 1998, two monitoring wells were installed at the location of the proposed extraction well. These wells are identified as 97-32I and 97-23D, and were constructed to collect ground water samples from the shallow portion and deep portion of the bedrock aquifer, respectively. Ground water samples collected from these wells in October 1998 did not reveal contaminant concentrations in excess of the ROD performance standards.

Based on this information, EPA determined that the installation of additional extraction wells in the Southern Area of the plume was not necessary. This determination was documented in a letter dated March 26, 1999.

EPA documents indicate that the Site achieved construction completion status when the Preliminary Close-Out Report was signed on May 28, 1999.

2007 ROD Amendment

The Remedial Action described in the 2007 ROD Amendment is being performed by a PRP in accordance with the 1991 Consent Decree. The Remedial Design for the remedial action described in the 2007 ROD Amendment was approved by EPA in September 2009. A PRP

mobilized its contractor to the Site and began remedial action construction activities in January 2010. At present, the remedial action is on-going and includes construction of the well house and necessary mechanical improvements at the new municipal well location, and installation of a water line between the new municipal supply well and the Bally public water supply. The remedial action is expected to be completed during 2010.

2008 Administrative Order on Consent (Vapor Intrusion)

A Response Action Plan prepared by Arcadis U.S. Inc. was approved by EPA on December 23, 2008. Construction of a sub slab depressurization (SSD) system was substantially completed by March/April 2009. At present indoor air monitoring is being performed at the former BES facility in accordance with the 2008 Administrative Order on Consent and EPA-approved Response Action Plan. Indoor air monitoring is performed to verify that the operation of the SSD reduces indoor air concentrations of Site-related hazardous substances to acceptable levels at tenant spaces within the former BES facility. As part of the removal action, a long-term indoor air monitoring program for the former BES facility will be prepared by the PRP for EPA review and approval.

System Operation/Operation and Maintenance

The current remediation system for the Site consists of MW#3, the two-stage air-stripper connected to MW#3, and a monitoring program which includes influent and effluent from the air-stripper and ground water monitoring. In addition, pursuant to the 2008 AOC, a sub slab depressurization (SSD) system is operated and maintained at the former BES facility to address vapor intrusion which was determined to be occurring at two tenant spaces within the former BES facility.

Air-stripper Operation and Maintenance/Monitoring

The air-stripper associated with MW#3 is operated and maintained by contractors for a PRP and Borough personnel.

The contaminated influent to the air-stripper is sampled once per month. Effluent from the air-stripper is sampled four times per month.

Issues related to the operation and maintenance (O&M) of the air-stripper at MW#3 were reported between the first Five-Year Review (2000) and the second Five-Year Review (2005). Specifically, the Borough of Bally had expressed concerns regarding ice build-up on the air-stripper during extremely cold weather, the lack of an emergency power source at MW#3 and the air-stripper, and the lack of a back-up air-stripper, in the event that the current air-stripper cannot function due to an extended maintenance or repair activity. To respond to these concerns, a PRP has purchased and set up at MW#3 a back up air-stripper system. The backup air-stripper is a "shallow tray" unit which resides in a heated trailer. Therefore, in the event of icing at the main air-stripper, the backup air-stripper can operate until the icing is addressed. A PRP has also performed the necessary electrical work at MW#3 that will allow for a rented emergency power

generator to provide electricity to MW#3 and the air-stripper in the event that a loss of power occurs in Bally.

Ground Water Monitoring

Arcadis G&M, Inc. (Arcadis) performs ground water monitoring on behalf of a PRP.

The following monitoring wells are currently included in the ground water monitoring program at the Site:

Annual monitoring: 92-19I, 97-23I
Semi-annual monitoring: 92-17, 92-18I, 92-20I

Sub slab Depressurization System Operation and Maintenance/Monitoring

As previously stated, a sub slab depressurization system (SSD) was constructed at the former BES facility to address vapor intrusion of Site-related VOCs into two tenant spaces. The SSD was substantially complete in March/April 2009. Monitoring of the efficacy of the SSD is on-going. Monitoring of the SSD includes indoor air monitoring at the former BES facility, vacuum monitoring beneath the slab of a portion of the former BES facility to evaluate the extent to which sub slab depressurization is being exerted by the SSD, and monitoring of effluent from the SSD. During the summer 2010, the PRP project coordinator (Arcadis U.S. Inc.) will provide EPA with an annual report documenting installation and performance of the SSD system. Long term monitoring of the SSD system, and long term air monitoring at the former BES facility will be addressed in that report, which is subject to EPA review and approval in accordance with the existing AOC.

V. Progress Since the Last Five-Year Review

This is the third Five-Year Review for the Site.

The second Five-Year Review for the Site was issued on June 9, 2005. The second Five-Year Report made the following conclusions regarding the Site:

"*The remedy at the Site is not protective because 1,4 –dioxane, a Site-related contaminant, was identified in Bally's municipal water system in 2003. The PRP is currently preparing a FFS to address feasible treatments for the contaminant and the feasibility of installing a new supply well in an uncontaminated area. Selection of the remedy will be performed by EPA in accordance with the NCP. The PRP has supplied bottled water to residents that requested it.*

Vapor intrusion is another issue that needs to be resolved before the Site can be protective. The PRP will perform a vapor intrusion investigation at the Site in accordance with the EPA approved work plan.

The remedy outlined in the 1989 ROD and subsequent ESD has been implemented, with the exception of properly abandoning one residential well, which is currently not in use. The well will be properly abandoned by the PRPs in the near future."

As mentioned above, in 2007 EPA issued a ROD Amendment which included a selected remedy to address the presence of 1,4-dioxane in the Bally public water supply. The selected remedy in the ROD Amendment included the installation of a new municipal supply well in an area not impacted by the Site, connection of the new supply well to the Bally public water supply, and disconnection of the 1,4-dioxane contaminated well (MW#3) from the Bally public water supply. The Remedial Design for the remedial action described in the ROD Amendment was approved in September 2009. The remedial action was initiated by the remedial action contractor in January 2010. At present the remedial action is being performed by the remedial action contractor under the oversight of the PRP Project Coordinator (Arcadis U.S. Inc.) and EPA. The construction of the new well for the Bally public water supply will be completed during 2010. As mentioned above, EPA and a PRP entered into an Administrative Order on Consent (AOC) on September 30, 2003 to address the presence of 1,4-dioxane in the Bally public water supply. The AOC required, among other work items, that users of the Bally public water supply be provided with bottled drinking water. Bottled drinking water will be provided to users of the Bally public water supply until the remedy selected by EPA in the 2007 ROD Amendment (new municipal supply well) to address 1,4-dioxane in the water supply has been implemented.

As mentioned above, a Response Action Plan prepared by Arcadis U.S. Inc. (PRP contractor) was approved by EPA on December 23, 2008. Construction of a sub slab depressurization (SSD) system was substantially completed by March/April 2009. At present indoor air monitoring is being performed at the former BES facility to verify that the operation of the SSD reduces indoor air concentrations of Site-related hazardous substances to acceptable levels. As part of the removal action, a long-term indoor air monitoring program for the former BES facility will be prepared by the PRP for EPA review and approval.

Finally, the private well discussed in the 2005 Five Year Review report as requiring proper abandonment, was properly abandoned as documented above.

VI. Five-Year Review Process

Administrative Components

Members of the local government of the Borough of Bally, the Project Coordinator (employee of Arcadis U.S. Inc.), and PADEP were notified of the initiation of the Five-Year Review in January-April 2010.

The Five-Year Review Team was led by the EPA Remedial Project Manager (RPM) for the Site.

The review team established the review schedule which included:

- Community Involvement;
- Document Review;
- Data Compilation and Review;
- Site Inspection;
- Local Interviews; and
- Five-Year Review Report Development and Review

Community Involvement

The general public in the vicinity of the Site was notified of the performance of the Five-Year Review by publishing an advertisement in the following newspaper: Boyertown Area Times newspaper. Advertisements in these papers were placed by EPA on May 5, 2010. The Boyertown Times newspaper is based out of Boyertown, Pennsylvania, and The Mercury is based out of Pottstown, Pennsylvania. These newspapers serve the community in the vicinity of the Site.

Activities to involve the community in the Five-Year Review were initiated by interviewing the following individuals:

1. Bally Borough Manager
2. PADEP Project Manager
3. Project Coordinator for a PRP

During the interviews, representatives of EPA summarized the findings of the Site Inspection and asked for any input on concerns of the protectiveness of the remedy.

Document Review

This Five-Year Review consisted of a review of relevant documents including:

- ROD – Signed June 30, 1989
- ESD#1 – Signed January 19, 1990
- PCOR – Signed May 28, 1999
- Five-Year Review – Signed June 8, 2000
- Five-Year Review – Signed June 9, 2005
- ROD Amendment – Signed August 1, 2007
- Administrative Order on Consent between EPA and PRP – entered into on October 16, 2008

Data Review

The following reports were reviewed during the performance of this Five-Year Review:

- Phase I Investigation, prepared by ERM, prepared for Allegheny International, Inc., dated February 11, 1986.
- Hydrogeologic Investigation of the BES, Inc. Facility, prepared by ERM, prepared for BES, dated October 27, 1986.
- Final Phase III Remedial Investigation Report, prepared by REMCOR, Inc., prepared for Allegheny International, Inc., dated May 1989.
- Report of Findings – Northern Area Investigation, prepared by CEC, prepared for Sunbeam-Oster Company, Inc., dated February 17, 1995.
- Southern Area Monitoring Reports, prepared by CEC, prepared for Sunbeam Oster Company, Inc. or B. Koh & Associates, dated April 2, 1996, December 18, 1996, June 24, 1997, January 30, 1998, July 16, 1998, and February 2, 1999.
- Report on Initial 1,4-dioxane Sampling and Analysis Results, prepared by CEC, dated April 20, 2003.
- Ground water Monitoring Report – March 2003 Sampling Event, prepared by Arcadis, prepared on behalf of AHI, dated June 3, 2003.
- Annual and Semi-Annual Ground water Monitoring Results, prepared by Arcadis, dated June 8, 2004.
- Annual Ground water Monitoring Results, prepared by Arcadis, dated January 11, 2005.
- March 2005 Annual Ground water Sampling results, prepared by Arcadis, dated May 13, 2005.
- Bally Well No. 3 – Discharge Monitoring Reports, prepared monthly by Systems Design Engineering, Inc., prepared for PADEP Water Management Program on behalf of the Borough of Bally, dated January 2008 through January 2010.
- Remedial Action Progress Report, prepared by Arcadis, dated February 25, 2010

Ground Water

Review of the ground water monitoring data included in the 2010 Remedial Action Progress Report prepared by Arcadis reveals that a Site-related plume of contaminated ground water contamination continues to exist beneath a portion of the Borough of Bally. A depiction of the plume included in the Remedial Action Progress Report is included as Attachment 7. One extraction well (MW#3) is used to extract contaminated ground water from the plume for treatment by a two-stage air-stripper. Review of the RI report reveals that a ground water sample collected from MW#3 in 1989 exhibited a total VOC concentration (1,1,1-TCA, TCE, 1,1-DCE, etc.) of 1,390 ppb. Review of MW#3 documentation between February 2009 and January 2010 indicates that total VOC concentrations during this 12-month period varied between 817 ppb and 1316 ppb. On-going oversight of the remediation of contaminated ground water at the Site will be continue to be performed by EPA's evaluation of the annual PRP-prepared Remedial Action Progress Reports.

Surface Water

Site-related contaminants have the potential to enter surface water via two routes: seepage of contaminated ground water to unnamed tributaries of the West Branch in the Southern Area of the

plume, and discharge from the air-stripper to an unnamed tributary of the West Branch.

Surface water sampling from unnamed tributaries of the West Branch, present in the Southern Area of the plume, was performed between 1995 and 1998. Review of the surface water sampling results collected from the Southern Area of the plume did not reveal Site-related contaminant concentrations of concern to human health or the environment.

At the time of the preparation of this Five Year Review report, EPA has issued a draft ESD for public comment (public comment period is June 1 – June 30, 2010) which pertains to the location of the surface water discharge for MW#3 and the associated air-stripper. The ESD changes the location of the surface water discharge from an unnamed tributary of the West Branch, which is located nearly adjacent to MW#3, to the West Branch itself at a location approximately one-mile west of MW#3. The new discharge location for MW#3 will be compliant with a National Pollutant Discharge Elimination System (NPDES) permit issued by PADEP for 1,4-dioxane, and other Site-related hazardous substances.

Air-stripper

Review of the air-stripper discharge monitoring reports (DMRs) for January 2008 through January 2010 reveals that the air-stripper removes VOCs from MW#3 well water prior to delivery of that water to the Bally water system or to a nearby unnamed tributary of the West Branch.

Review of the DMRs indicates that chloroform, TCA, TCE, and PCE were not detected in weekly samples of treated water (post air-stripper) collected between January 2008 and January 2010 at concentrations above drinking water standards.

Review of the DMRs indicates that methylene chloride was identified in treated water (post air-stripper) at a concentration above its SDWA MCL (5 ppb) in 4 weekly samples (October 9, 2008 – 6.7 ppb; April 23, 2009 – 16.5 ppb; June 18, 2009 – 20.3 ppb; December 3, 2009 – 5.6 ppb). However, review of monthly MW#3 water samples collected before air-stripper treatment indicates that only one sample exhibited a methylene chloride concentration above the SDWA MCL (June 2008 – 5.7 ppb). Review of Table 2 of the 1989 ROD indicates that methylene chloride was not detected in MW#3. Review of the 2003 Ground Water Monitoring Report, and the 2010 Remedial Action Progress Report indicates that methylene chloride was not present in Site ground water monitoring wells. Therefore, the methylene chloride concentrations in the 4 weekly post-treatment water samples are expected to be related to cross contamination issues at the analytical laboratory, rather than Site-related ground water contamination. This issue will continue to be evaluated by EPA oversight of monthly DMRs, and annual oversight of Remedial Action Progress Reports

Well water from MW#3 (pre-treatment) continues to exhibit Site-related VOCs at concentrations that exceed MCLs. However, as previously explained, the contaminant "1,4-dioxane" is not removed from well water by the air-stripper. A remedial action is currently being performed at the Site (new municipal supply well construction) to remove 1,4-dioxane from the Bally public

water supply. This remedial action will be completed in 2010.

As part of the 2005 Five-Year Review, EPA evaluated VOC emissions from the air-stripper to determine whether or not those emissions pose an unacceptable threat to human health. In support of the 2005 evaluation, the PRP provided EPA with data pertaining to the air-stripper, including the physical characteristics of the air-stripper, the rate of contaminated water treated by the air-stripper, etc. EPA performed air-modeling using this data to determine what concentrations of Site-related contaminants in vapor form would be potentially inhaled by downwind human receptors. EPA performed a risk assessment using the air-modeling results. Risk assessment results indicated that the non-cancer risk posed by the air-stripper emissions was well below levels of concern. The cancer risk posed by the air-stripper emissions was determined to be six in 1,000,000. According to the NCP (40 CFR § 300.430), "For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual between 1 in 10,000 and 1 in 1,000,000 using information on the relationship between dose and response." The cancer risk associated with the air-stripper emissions lies within the acceptable exposure levels. It should be noted that the risk assessment was performed using conservative risk assessment parameters, specifically with regard to the toxicity of TCE. Based on a review of this information, the emissions from the air-stripper at MW#3 were not considered to pose an unacceptable threat to human health. A similar evaluation of the air stripper emissions was performed for this 2010 Five Year Review, and is discussed below (see Section VII of this Five Year Review report).

Performance Standards

The performance standards which are to be met by the execution of the remedy at the Site are listed on Table 2 of the ROD (see Attachment 5). For ground water, the performance standards are based on a PADEP Municipal Water Supply Permit and SDWA MCLs. The performance standards for discharge to surface water are based on a PADEP National Pollutant Discharge Elimination System (NPDES) permit for the effluent from the air-stripper at MW#3. These performance standards are listed in Table 2 of the ROD (See Attachment 5). As noted above, during the preparation of this Five-Year Review report, EPA has prepared a draft Explanation of Significant Differences (ESD) which has been issued for public comment and review. The draft ESD pertains to the relocation of the surface water discharge of the MW#3 air stripper from an unnamed tributary of the West Branch (located nearly adjacent to MW#3) to the West Branch itself at a location approximately 1-mile west of the Site. The effluent limits for the air-stripper at the proposed discharge location are based on a 2005 PADEP NPDES permit, which was issued subsequent to the 1989 ROD. As indicated in the draft ESD, EPA considers the effluent limits included in the 2005 PADEP NPDES permit to be protective of human health and the environment.

Site Inspection

A Site inspection was performed on April 27, 2010.

The Site inspection was attended by Mr. Mitch Cron, EPA RPM.

The purpose of the inspections was to assess the protectiveness of the remedy. The Site visit included a review of the former BES facility, and MW#3 and the air-stripper, the SSD system, and the overall construction site of the new municipal well required in the 2007 ROD Amendment.

The Site inspection did not identify concerns pertaining to the selected remedy.

Interviews

The following individuals were interviewed during the performance of the Five-Year Review:

Borough Manager: The Borough Manager and the EPA RPM discussed the construction of the new well, the vapor intrusion mitigation system which had been constructed at the former BES facility, and other Site-related issues. The Borough Manager expressed no significant concerns with respect to the selected remedy, and indicated that to his knowledge new wells have not been installed in the Borough of Bally.

PADEP Project Officer: The PADEP Project Officer and the EPA RPM discussed the status of Supefund response actions at the Site. The PADEP Project Officer expressed no specific concerns with regard to the response actions being implemented at the Site.

Project Coordinator: The Project Coordinator (who coordinates PRP-led response actions at the Site) and the EPA RPM discussed the status of Superfund response actions at the Site. The Project Coordinator expressed concern with regard to the level of cooperation/coordination between the Borough of Bally, and a PRP who is performing response actions at the Site.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Yes.

As part of the technical assessment of the remedy, the specific remedial action objectives (RAOs) outlined in the ROD were reviewed. The specific RAOs outlined in the ROD for the cleanup of the Site were to:

1. Prevent current and future ingestion of ground water containing unacceptable levels of VOCs.

2. Restore the aquifer within a reasonable time frame to a condition such that levels of the VOC contaminants of concern are below remediation levels consistent with its use as a Class II aquifer.

The first RAO is partially achieved by the use of the air-stripper. Review of January 2008-January 2010 effluent data from the air-stripper reveals that VOCs are removed from well water prior to distribution in the Bally public water supply.

However, the compound 1,4-dioxane, a Site-related hazardous substance, is not removed by the air-stripper prior to distribution in the Bally water system. Therefore, the first RAO has not been fully achieved. A remedial action is currently being performed at the Site to address the presence of 1,4-dioxane in the Bally public water supply (new municipal supply well). Upon completion, Site-related hazardous substances will not be present in the Bally public water supply and the first Remedial Action Objective will be achieved. Until the remedial action is complete, bottled drinking water will continue to be provided to users of the Bally public water supply.

The second RAO has not yet been achieved. The ground water remedy has been operating for approximately 21 years (1989 – 2010). Current contaminant concentrations at the Site extraction well are similar to 1989 contaminant concentrations, and progress towards achieving the remedial action objective of restoring the contaminated aquifer has been limited. Therefore, optimization of the ground water remedy should be performed.

Each of the elements of the Selected Remedy listed in the ROD (see Section IV, above) have been completed. The elements of the Selected Remedy in the 2007 ROD Amendment are under construction. The elements of the Selected Remedy discussed in the 2008 AOC, pertaining to vapor intrusion at the former BES facility, have been constructed. Air monitoring is currently being performed at the former BES facility to confirm that the response actions taken by the PRP have successfully addressed vapor intrusion.

Optimization Opportunities

The focus of the remedy is the cleanup of the ground water contamination plume using MW#3 as an extraction well, and treating water pumped from MW#3 using an air-stripper. Opportunities may exist for optimizing the ground water cleanup at the Site, including evaluation/use of innovative ground water cleanup technologies that were not widely used or considered when the remedy was selected in 1989. Therefore, optimization of the ground water remedy should be performed.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid?

Changes in Standards and TBCs: Have they been revised and, if so, could this call into question the protectiveness of the remedy?

The ROD stated that methylene chloride did not have an MCL, and an MCL was not given for 1,2-dichloroethane (1,2-DCA). Methylene chloride has an MCL of 5 ug/L, and 1,2-DCA has an MCL of 5 ug/L. The MCLs for trichloroethene (TCE), 1,1,1,-trichloroethane (1,1,1-TCA), tetrachloroethene (PCE), and 1,1-dichloroethene (1,1-DCE) have not changed.

The protectiveness of the remedy is dependent upon the protectiveness of the cleanup standards. As described below, EPA has evaluated the cleanup standards for the Site, and has determined that the cleanup standards are protective of human health. For groundwater, these standards were as follows: TCE, 5 ug/L; 1,1,1-TCA, 200 ug/L; PCE, 5 ug/L; 1,1-DCE, 7 ug/L; 1,1-DCA, not specified; methylene chloride, 5 ug/L; 1,2-DCA, not specified. If these concentrations, along with the MCL of 5 ug/L for 1,2-DCA, were achieved, then the risks could be estimated using current risk assessment methodology and assumptions. At these concentrations, the total cancer risk would be 8E-5 and the Hazard Index would be 0.04 for the child and 0.06 for the adult. Therefore, unless significant amounts of other site-related chemicals were found that are not on this list, the cleanup standards are within the 1E-4 to 1E-6 cancer risk goal, and they meet the non-cancer goal of a Hazard Index at or below 1.

1,4-dioxane, a chemical that was not originally identified at the time of the ROD, was later discovered in the groundwater. This chemical is a solvent stabilizer that is not removed by air stripping. EPA estimated the cancer risk from this chemical to be between 1E-4 and 1E-6. However, because this cancer risk was in addition to the past exposures, EPA considered this risk to be of potential concern. The PRP elected to give bottled water to local residents who requested it. EPA and the PRP also entered into an Administrative Order on Consent with respect to this issue, with a cleanup goal of 3 ug/L for 1,4-dioxane. The risk estimates for this chemical have not changed, and thus this goal for 1,4-dioxane is still protective. The placement of a new public-water-supply well has also begun; the goal was to complete this well's hookup by summer 2010. However, treatment of the contaminated groundwater to restore the aquifer will also continue.

Changes in Exposure Pathways: Has land use or expected land use changed? Have new routes of exposure or receptors been identified? Are there newly identified contaminants or contaminant sources? Are there unanticipated toxic byproducts of the remedy? Have physical conditions or the understanding of those conditions changed? For each of these, how is the protectiveness of the remedy affected?

Since the ROD, there have been a few changes in land use, as well as new knowledge about site conditions, exposure routes and contaminant sources. One additional contaminant was newly identified. These issues are discussed below.

New residences were built near the industrial facility after the ROD, and these houses were studied by EPA for evidence of vapor intrusion. EPA did not find significant vapor buildup beneath the slabs of these local townhouses.

The industrial facility, which is now divided into space used by several different companies, was also studied for vapor intrusion. In this case, EPA did find unacceptable concentrations of vapors accumulating beneath the slab and migrating to the indoor air. The PRP then installed a vapor mitigation system at the facility. In August 2009, EPA found that of two areas sampled within the facility both pre- and post-mitigation, one location appeared to improve. Two indoor locations were also notable for being at or near levels of potential concern from TCE: IAQ-106 and IAQ-

101, which were to be resampled. In more recent sampling, concentrations at IAQ-101 and IAQ-106 had dropped noticeably.

In preparation for this five-year review, the industrial indoor air samples and ambient air samples were evaluated under baseline (pre-mitigation system), worst-case (post mitigation system), and most recent conditions (post mitigation system). In five cases (IAQ-103, IAQ-104, IAQ-105, IAQ-107, and upwind), the baseline conditions were the worst case. At IAQ-106, the worst-case conditions yielded a worker Hazard Index above 1 due to TCE (and at IAQ-101, the worker HI was 1.4, rounded to 1, which was borderline acceptable). However, at all locations, the most recent data were within the acceptable risk ranges (HI 1 or less, cancer risk 1E-6 to 1E-4 or less).

In addition to monitoring indoor air for the standard VOCs, the workspace was also sampled for 1,4-dioxane at the request of the EPA RPM, and EPA reviewed the results of this sampling early in 2009. Although its presence was believed to be unlikely due to the difficulty in getting it to volatilize from moist media into air, 1,4-dioxane was found in one indoor air sample, although not at a concentration of concern. Furthermore, the subslab depressurization system would be expected to address this chemical even if it is present.

The installation of the depressurization system does not mean that vapors are now vented to ambient air instead of being allowed to accumulate within the building. The emissions undergo carbon treatment to remove VOCs before venting, although breakthrough was reported on at least one occasion. EPA studied these emissions to ensure that they were within acceptable levels, and confirmed that even if the carbon treatment failed, the concentrations would still be within the acceptable range (Hazard Index less than or equal to 1, cancer risk 1E-6 to 1E-4 or less). However, risks will be minimized if the carbon treatment is maintained.

The risks from air stripper emissions on MW#3 were also evaluated. In 2005, EPA found these risks to be within the protective range. In 2010, EPA updated this assessment with current information, and found that the maximum annual ambient average air concentrations associated with air-stripper emissions would still be well below levels of concern.

1,4-Dioxane was a contaminant discovered in 2003; it was discussed in the previous section of this five-year review. Bottled drinking water continues to be provided to users of the Bally public water supply, as does treatment of the groundwater (via the pump and treat system at MW#3). As noted elsewhere in this Five Year Review report the remedial action to construct a new uncontaminated municipal supply well to replace the contaminated municipal supply well (MW#3) has begun and will be completed in 2010.

The most contaminated portion of the ground water contamination plume lies approximately between the former BES facility (source of Site ground water contamination) and MW#3 (Site extraction well). In addition, a less contaminated portion of the plume underlies part of the Borough of Bally. Historical environmental investigation reports for the Site identify the portion of the plume north of Route 100, which exhibits higher ground water contaminant concentrations, as the "Northern Area." Historical reports identify the less contaminated portion of the plume

south of Route 100 as the "Southern Area." Currently, no Northern Area monitoring wells are included in the ground water monitoring program. However, review of the RI report reveals that a ground water sample collected from MW#3 (Site extraction well) in 1989 exhibited a total VOC concentration (1,1,1-TCA, TCE, 1,1-DCE, etc.) of 1,390 ppb. More recently review of MW#3 (Site extraction well) documentation between February 2009 and January 2010 indicates that total VOC concentrations at MW#3 during this 12-month period varied between 817 ppb and 1,316 ppb. The five monitoring wells currently included in the ground water monitoring program (see page 13) are located in the Southern Area. EPA reviewed the most recent groundwater monitoring well data (2005-2009) provided in the 2010 Remedial Action Progress Report. The 2005-2009 data was collected from the five monitoring wells located in the Southern Area plume, and is summarized as follows: Methylene chloride was found above the MCL and risk-based screening level in one sample, but this has not occurred again since 2005. TCE was found in several samples above the MCL of 5 ug/L and the risk-based screening level of 2 ug/L (maximum concentration 19 ug/L). 1,4-Dioxane exceeded its cleanup goal of 3 ug/L, and 11DCE exceeded its MCL of 7 ug/L (maximum 12 ug/L). Other detected chemicals (1,1,1-TCA and trichlorofluoromethane) were below MCLs and levels of concern. These monitoring wells are not sources of potable water at present, and therefore there are no currently unacceptable risks associated with this water. However, these results indicate that the groundwater remedy is not yet complete. The results also appear to indicate that no new contaminants of concern have been identified since 1,4-dioxane was added to the list.

Changes in Toxicity and Other Contaminant Characteristics: Have they changed and, if so, could this call into question the protectiveness of the remedy?

Some toxicity values have changed since 1989. However, the protectiveness of the remedy in groundwater is driven by the cleanup goals, and their protectiveness was discussed above. Risks from other sources (vapor intrusion, emissions from the depressurization system, air stripper emissions) were found to be acceptable under current conditions, as discussed above.

Changes in Risk Assessment Methods: Have methods changed and, if so, how does this affect the protectiveness of the remedy?

New risk assessment guidance has been introduced since 1989. However, the protectiveness of the groundwater cleanup goals and other sources of risk (vapor intrusion, emissions from the depressurization system, air stripper emissions) was evaluated and confirmed using current methodology, as discussed above.

Expected Progress Toward Meeting RAOs: Is the remedy progressing as expected?

Current site conditions are protective, and the remedy must be maintained and continued to ensure future protectiveness. In particular, the carbon treatment on the air emissions should be closely monitored to prevent breakthrough, and the success of the subslab depressurization system should be monitored periodically.

The ground water remedy has been operating for approximately 21 years (1989 – 2010). Current contaminant concentrations at the Site extraction well are similar to 1989 contaminant concentrations, and progress towards achieving the remedial action objective of restoring the contaminated aquifer has been limited. Therefore, optimization of the ground water remedy should be performed.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

Technical Assessment Summary

Issues at the Site which were identified in previous Five Year Reviews are being addressed by on-going remedial and removal actions at the Site. Long-term cleanup of the ground water contamination will continue.

VIII. Issues

Table 2- Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
The ground water remedy has been operating for approximately 21 years (1989 – 2010). Current contaminant concentrations at the Site extraction well are similar to 1989 contaminant concentrations, and progress towards achieving the remedial action objective of restoring the contaminated aquifer has been limited. Therefore, optimization of the ground water remedy should be performed.	N	N

IX. Recommendations and Follow Up Actions

Table 3- Recommendations

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)
The ground water remedy has been operating for approximately 21 years (1989 – 2010). Current contaminant concentrations at the Site extraction well are similar to 1989 contaminant concentrations, and progress towards achieving the remedial action objective of restoring the contaminated aquifer has been limited. Therefore, optimization of the ground water remedy should be performed.	Optimization of the ground water remedy should be performed.	PRP	EPA/PADEP	6/9/2013	N

X. Statement on Protectiveness.

As described in the 2007 Record of Decision Amendment, the Site consists of three operable units (OUs):
OU-1 – Plume of Ground Water Contamination
OU-2 – Bally public water system (which exhibits 1,4-dioxane)
OU-3 – Vapor Intrusion

The remedy at OU-1 is protective of human health and the environment because exposure pathways have been eliminated.

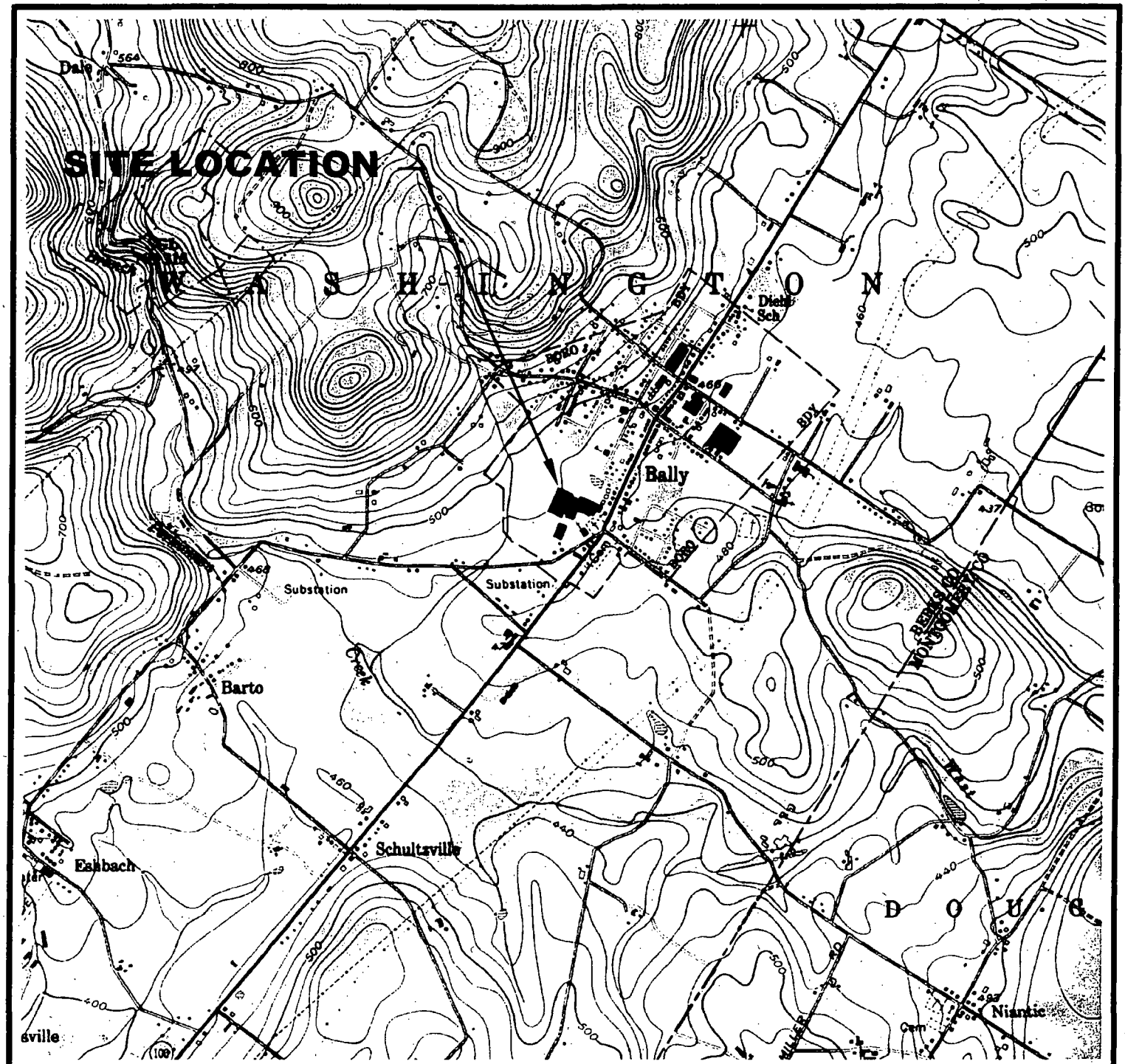
The remedy at OU-2 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

The remedy at OU-3 is protective of human health and the environment because exposure pathways have been eliminated.

XI. Next Five-Year Review.

The next Five-Year Review will be completed no later than five years after the signature date of this Five-Year Review.

ATTACHMENT 1

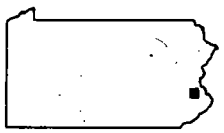


SCALE 1:24000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

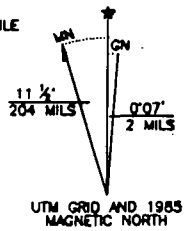
1 .5 0 1 KILOMETER



QUADRANGLE LOCATION

CONTOUR INTERVAL 20 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929



UTM GRID AND 1985 MAGNETIC NORTH

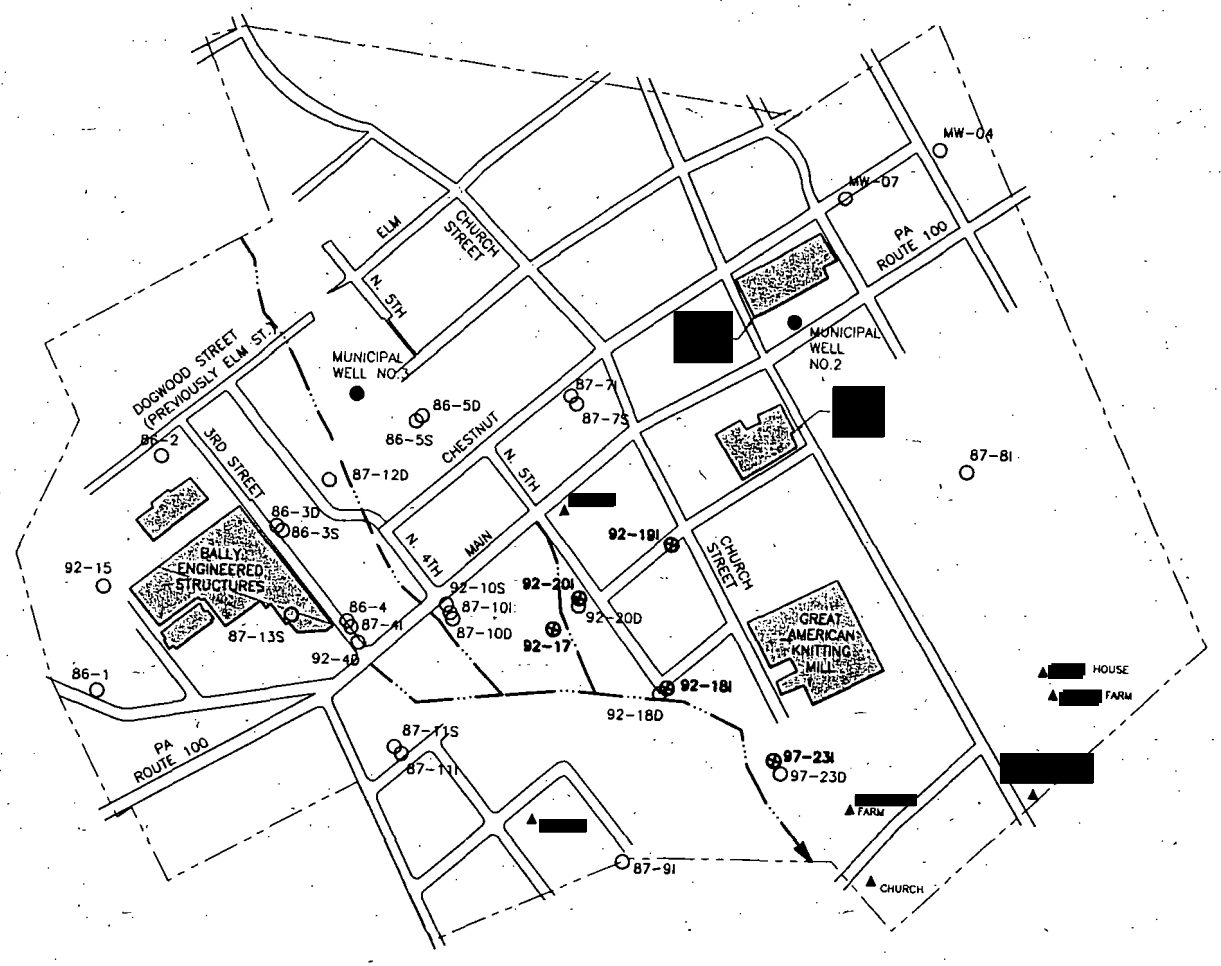
SOURCE: USGS 7.5 MIN. TOPOGRAPHICAL QUADRANGLES PHILADELPHIA, PENNSYLVANIA 1967, PHOTOREVISED 1985.

ARCADIS

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	JULY 2005	M. BEDARD	M. BEDARD
SITE LOCATION MAP BALLY GROUNDWATER SITE BALLY, PENNSYLVANIA		LEAD DESIGN PROF. M. BEDARD	CHECKED C. Sharpe
		PROJECT NUMBER NP000597.0007	DRAWING NUMBER 1

G:\APROJECT\AH Bally, PA\PHASE -07 Monitoring\Annual-semiannual Program (SAM)\Reporting\2009\January 2010 Draft\Figures\FIG-1 Site Location.dwg 02/18/10

ATTACHMENT 2



0 500
SCALE IN FEET

NO.	DATE	REVISION DESCRIPTION	BY	CKD

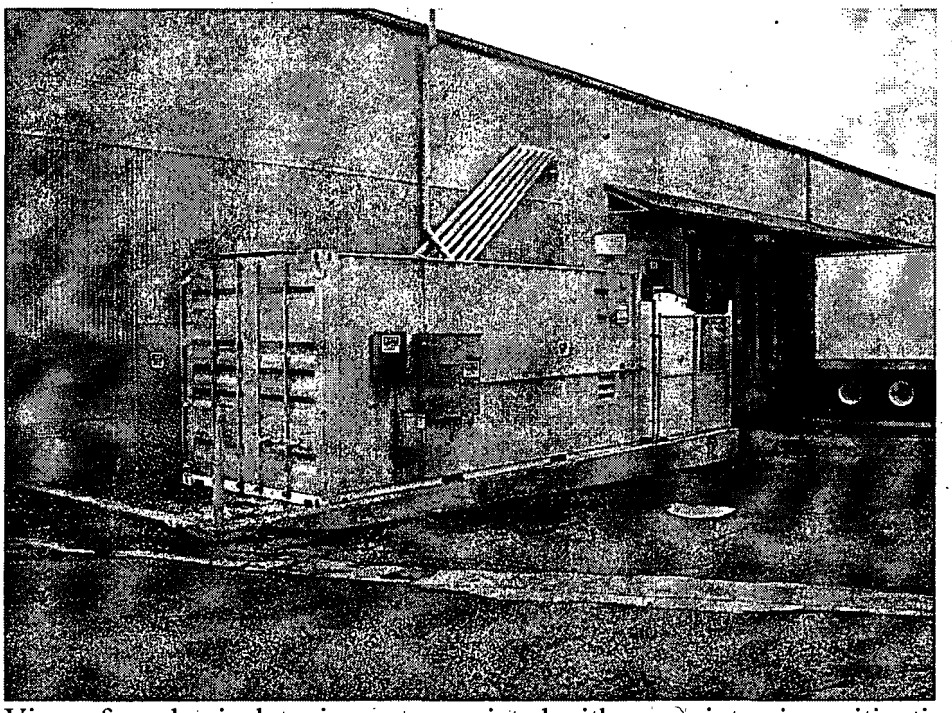
ARCADIS

BALLY GROUNDWATER SITE
BALLY BOROUGH
BERKS COUNTY, PENNSYLVANIA

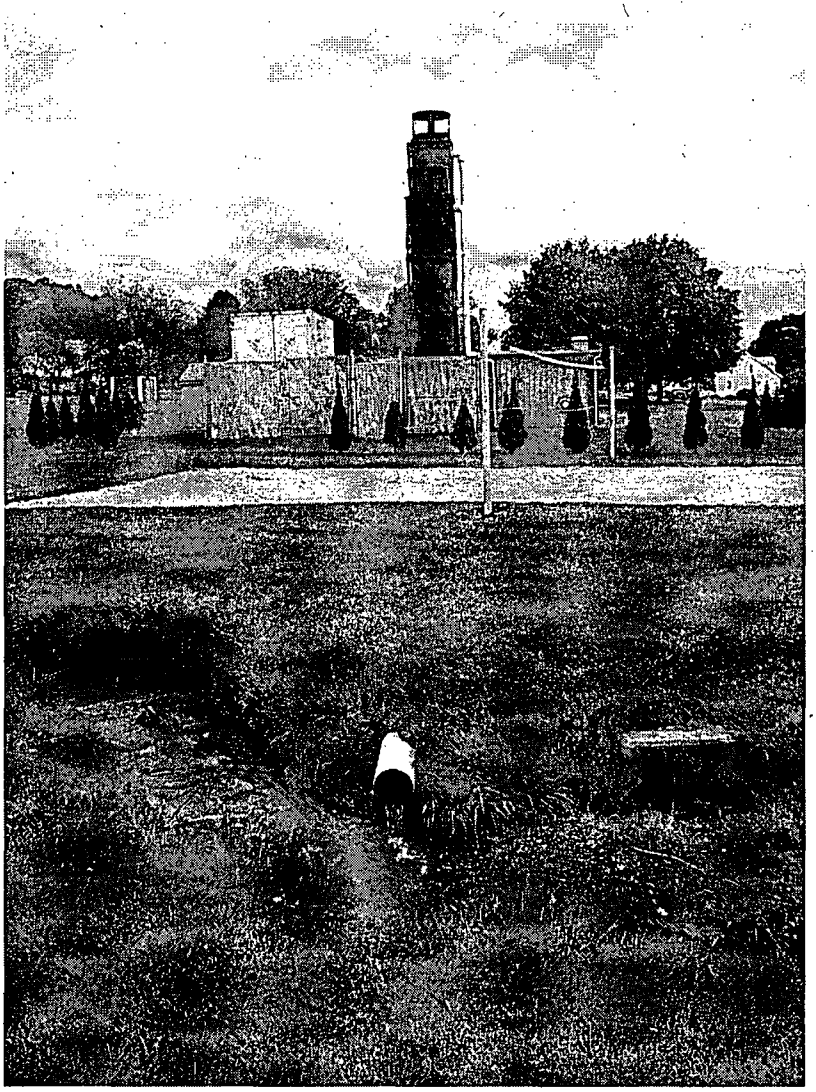
WELL LOCATION MAP

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	11/08/04	M. BEDARD	M. BEDARD
		LEAD DESIGN PROF. F. LENZO	CHECKED C. SHARPE
		PROJECT NUMBER NP00597.007	DRAWING NUMBER 2

ATTACHMENT 3



View of mechanical equipment associated with vapor intrusion mitigation system at former Bally Engineered Structures facility (April 2010).



View of discharge pipeline from Municipal Well Number Three air-stripper treatment system to unnamed tributary of West Branch of Perkiomen Creek. (April 2010)

View of Municipal Well Number Three and associated air-stripper treatment system (two black vertical towers). (April 2010)

View of well house at new municipal supply well site. (April 2010)

View of new well house. (April 2010)

ATTACHMENT 4

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: BALLY GW	Date of inspection: APRIL 27, 2010
Location and Region: BALLY, PA, 3	EPA ID:
Agency, office, or company leading the five-year review:	Weather/temperature: SUNNY

Remedy Includes: (Check all that apply)

- Landfill cover/containment
- Access controls
- Institutional controls
- Groundwater pump and treatment
- Surface water collection and treatment
- Other NEW MUN. WELL; VI MITIGATION SYSTEM

Attachments: Inspection team roster attached — Site map attached → FYR report

II. INTERVIEWS (Check all that apply)

1. O&M site manager _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

2. O&M staff _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

interviews w/ BORO MANAGER; PADEP PO; PRP PROJ. COORDINATOR DOCUMENTED IN BALLY GW LOG BOOK.

3. Local regulatory authorities and response agencies (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Bally BORO. MNGR
Contact Leo MUTTER _____ 4/27/10
Name Title Date Phone no.
Problems; suggestions; Report attached See log book

Agency _____
Contact _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

4. Other interviews (optional) Report attached.

PAPER PO - SEE LOG BOOK
PRP PROS. COORD - " " "

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - O&M manual — Readily available Up to date — N/A
   - As-built drawings — Readily available Up to date — N/A
   - Maintenance logs — Readily available Up to date — N/A

   Remarks

2. **Site-Specific Health and Safety Plan** — Readily available Up to date — N/A
   - Contingency plan/emergency response plan — Readily available Up to date — N/A

   Remarks

3. **O&M and OSHA Training Records** — Readily available Up to date — N/A

   Remarks

4. **Permits and Service Agreements**
   - Air discharge permit — Readily available Up to date — N/A
   - Effluent discharge — Readily available Up to date — N/A
   - Waste disposal, POTW — Readily available Up to date — N/A
   - Other permits — Readily available Up to date — N/A

   Remarks FACILITY (SITE RBT DISCHARGING PURSUANT TO 2005 PADEP NPDES PERMIT) – WILL BE UPDATED POST ESD.

   NPDES EXPIRED 2/2011 (on-site discharge) – proposed discharge will be off-site w/ PADEP NPDES PERMIT

5. **Gas Generation Records** — Readily available Up to date — N/A

   Remarks

6. **Settlement Monument Records** — Readily available Up to date — N/A

   Remarks

7. **Groundwater Monitoring Records** — Readily available Up to date — N/A

   Remarks

8. **Leachate Extraction Records** — Readily available Up to date — N/A

   Remarks

9. **Discharge Compliance Records**
   - Air — Readily available Up to date — N/A
   - Water (effluent) — Readily available Up to date — N/A

   Remarks

10. **Daily Access/Security Logs** — Readily available Up to date — N/A

    Remarks

IV. O&M COSTS

1. O&M Organization

State in-house — Contractor for State
PRP in-house — Contractor for PRP
Federal Facility in-house — Contractor for Federal Facility
Other _____

2. O&M Cost Records DID NOT REQUEST - NC

Readily available Up to date
Funding mechanism/agreement in place
Original O&M cost estimate _____ Breakdown attached

Total annual cost by year for review period if available

From _____ Date	To _____ Date	_____ Total cost	Breakdown attached
From _____ Date	To _____ Date	_____ Total cost	Breakdown attached
From _____ Date	To _____ Date	_____ Total cost	Breakdown attached
From _____ Date	To _____ Date	_____ Total cost	Breakdown attached
From _____ Date	To _____ Date	_____ Total cost	Breakdown attached

3. Unanticipated or Unusually High O&M Costs During Review Period

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS — Applicable — N/A

A. Fencing

1. Fencing damaged — Location shown on site map — Gates secured — N/A

Remarks _____

B. Other Access Restrictions

1. Signs and other security measures — Location shown on site map — N/A

Remarks _____

C. Institutional Controls (ICs) BORO. ORDINANCE (ATTACHED)

1. Implementation and enforcement

Site conditions imply ICs not properly implemented — Yes (No) N/A

Site conditions imply ICs not being fully enforced — Yes (No) N/A

Type of monitoring (e.g., self-reporting, drive by) _____

Frequency _____

Responsible party/agency _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up-to-date — (Yes) No N/A

Reports are verified by the lead agency — (Yes) No N/A

Specific requirements in deed or decision documents have been met — (Yes) No N/A

Violations have been reported — Yes No (N/A)

Other problems or suggestions: Report attached

2. Adequacy — (ICs are adequate) ICs are inadequate N/A

Remarks _____

D. General

1. Vandalism/trespassing — Location shown on site map — (No vandalism evident)

Remarks _____

2. Land use changes on site — N/A

Remarks former BES FACILITY IS COMMERCIAL / INDUSTRIAL BUSINESS PARK

3. Land use changes off site — (N/A)

Remarks _____

VI. GENERAL SITE CONDITIONS

A. Roads — Applicable (N/A)

1. Roads damaged — Location shown on site map — Roads adequate N/A

Remarks _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface

1. Settlement (Low spots) Location shown on site map Settlement not evident
Areal extent _____ Depth _____
Remarks _____

2. Cracks Location shown on site map Cracking not evident
Lengths _____ Widths _____ Depths _____
Remarks _____

3. Erosion Location shown on site map Erosion not evident
Areal extent _____ Depth _____
Remarks _____

4. Holes Location shown on site map Holes not evident
Areal extent _____ Depth _____
Remarks _____

5. Vegetative Cover Grass Cover properly established No signs of stress
Trees/Shrubs (indicate size and locations on a diagram)
Remarks _____

6. Alternative Cover (armored rock, concrete, etc.) N/A
Remarks _____

7. Bulges Location shown on site map Bulges not evident
Areal extent _____ Height _____
Remarks _____

8. Wet Areas/Water Damage Wet areas/water damage not evident
   Wet areas Location shown on site map Areal extent_____
   Ponding Location shown on site map Areal extent_____
   Seeps Location shown on site map Areal extent_____
   Soft subgrade Location shown on site map Areal extent_____
   Remarks_____

9. Slope Instability Slides Location shown on site map No evidence of slope instability
   Areal extent_____
   Remarks_____

B. Benches Applicable N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. Flows Bypass Bench Location shown on site map N/A or okay
   Remarks_____

2. Bench Breached Location shown on site map N/A or okay
   Remarks_____

3. Bench Overtopped Location shown on site map N/A or okay
   Remarks_____

C. Letdown Channels Applicable N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. Settlement Location shown on site map No evidence of settlement
   Areal extent_____ Depth_____
   Remarks_____

2. Material Degradation Location shown on site map No evidence of degradation
   Material type_____ Areal extent_____
   Remarks_____

3. Erosion Location shown on site map No evidence of erosion
   Areal extent_____ Depth_____
   Remarks_____

4. Undercutting Location shown on site map No evidence of undercutting
Areal extent _____ Depth _____
Remarks _____

5. Obstructions Type _____ No obstructions
Location shown on site map Areal extent _____
Size _____
Remarks _____

6. Excessive Vegetative Growth Type _____
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent _____
Remarks _____

D. Cover Penetrations Applicable N/A

1. Gas Vents Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
N/A
Remarks _____

2. Gas Monitoring Probes
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks _____

3. Monitoring Wells (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks _____

4. Leachate Extraction Wells
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks _____

5. Settlement Monuments Located Routinely surveyed N/A
Remarks _____

E. Gas Collection and Treatment	Applicable	N/A

1. Gas Treatment Facilities
   Flaring Thermal destruction Collection for reuse
   Good condition Needs Maintenance
   Remarks _____

2. Gas Collection Wells, Manifolds and Piping
   Good condition Needs Maintenance
   Remarks _____

3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)
   Good condition Needs Maintenance N/A
   Remarks _____

F. Cover Drainage Layer	Applicable	N/A

1. Outlet Pipes Inspected Functioning N/A
   Remarks _____

2. Outlet Rock Inspected Functioning N/A
   Remarks _____

G. Detention/Sedimentation Ponds	Applicable	N/A

1. Siltation Areal extent _____ Depth _____ N/A
   Siltation not evident
   Remarks _____

2. Erosion Areal extent _____ Depth _____
   Erosion not evident
   Remarks _____

3. Outlet Works Functioning N/A
   Remarks _____

4. Dam Functioning N/A
   Remarks _____

H. Retaining Walls Applicable N/A

1. Deformations Location shown on site map Deformation not evident
Horizontal displacement _____ Vertical displacement _____
Rotational displacement _____
Remarks _____

2. Degradation Location shown on site map Degradation not evident
Remarks _____

I. Perimeter Ditches/Off-Site Discharge Applicable N/A

1. Siltation Location shown on site map Siltation not evident
Areal extent _____ Depth _____
Remarks _____

2. Vegetative Growth Location shown on site map N/A
Vegetation does not impede flow
Areal extent _____ Type _____
Remarks _____

3. Erosion Location shown on site map Erosion not evident
Areal extent _____ Depth _____
Remarks _____

4. Discharge Structure Functioning N/A
Remarks _____

VIII. VERTICAL BARRIER WALLS Applicable N/A

1. Settlement Location shown on site map Settlement not evident
Areal extent _____ Depth _____
Remarks _____

2. Performance Monitoring Type of monitoring _____
Performance not monitored
Frequency _____ Evidence of breaching
Head differential _____
Remarks _____

IX. GROUNDWATER/SURFACE WATER REMEDIES	Applicable	N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines	Applicable	N/A

1. Pumps, Wellhead Plumbing, and Electrical
   Good condition All required wells properly operating Needs Maintenance N/A
   Remarks _____

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances
   Good condition Needs Maintenance
   Remarks _____

3. Spare Parts and Equipment
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines Applicable N/A

1. Collection Structures, Pumps, and Electrical
   Good condition Needs Maintenance
   Remarks _____

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances
   Good condition Needs Maintenance
   Remarks _____

3. Spare Parts and Equipment
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks _____

C. Treatment System	Applicable	N/A

1. Treatment Train (Check components that apply)
   - Metals removal
   - Oil/water separation
   - Bioremediation
   - Air stripping
   - Carbon adsorbers
   - Filters _____
   - Additive (e.g., chelation agent, flocculent) _____
   - Others _____
   - Good condition
   - Needs Maintenance
   - Sampling ports properly marked and functional
   - Sampling/maintenance log displayed and up to date
   - Equipment properly identified
   - Quantity of groundwater treated annually _____
   - Quantity of surface water treated annually _____

   Remarks _____

2. Electrical Enclosures and Panels (properly rated and functional)
   - N/A
   - Good condition
   - Needs Maintenance

   Remarks _____

3. Tanks, Vaults, Storage Vessels
   - N/A
   - Good condition
   - Proper secondary containment
   - Needs Maintenance

   Remarks _____

4. Discharge Structure and Appurtenances
   - N/A
   - Good condition
   - Needs Maintenance

   Remarks _____

5. Treatment Building(s)
   - N/A
   - Good condition (esp. roof and doorways)
   - Needs repair
   - Chemicals and equipment properly stored

   Remarks _____

6. Monitoring Wells (pump and treatment remedy)
   - Properly secured/locked
   - Functioning
   - Routinely sampled
   - Good condition
   - All required wells located
   - Needs Maintenance
   - N/A

   Remarks _____

D. Monitoring Data

1. Monitoring Data
   - Is routinely submitted on time
   - Is of acceptable quality

2. Monitoring data suggests:
   - Groundwater plume is effectively contained
   - Contaminant concentrations are declining

→ this should be verified via annual remedial action progress reports; optimization may be necessary/appropriate.

D. Monitored Natural Attenuation

1. Monitoring Wells (natural attenuation remedy)
   Properly secured/locked Functioning Routinely sampled Good condition
   All required wells located Needs Maintenance N/A
   Remarks _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

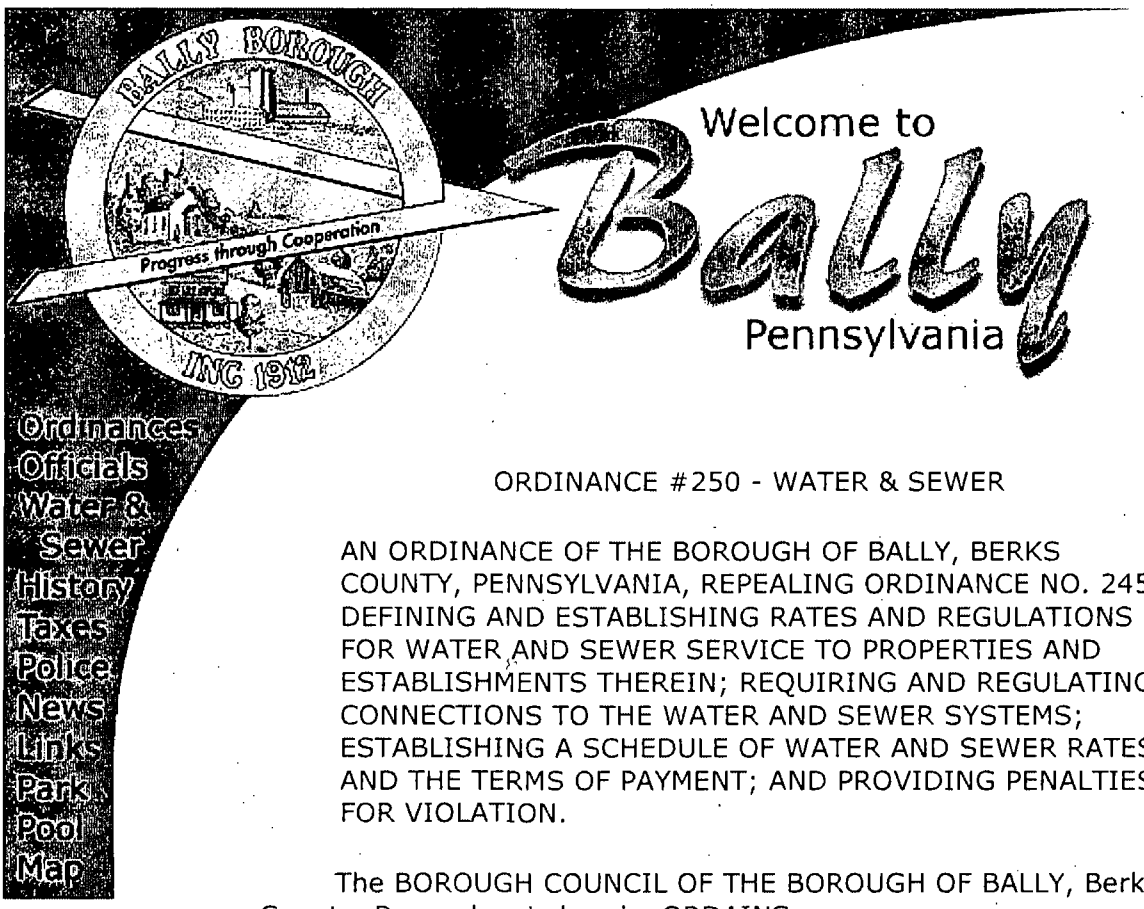
Overall significant progress of new municipal well & I/I mitigation system. Ow remedy optimization to restore aquifer may be appropriate.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

appear sufficient.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.
	NA
D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.
	yes - gw remedy.



ORDINANCE #250 - WATER & SEWER

AN ORDINANCE OF THE BOROUGH OF BALLY, BERKS COUNTY, PENNSYLVANIA, REPEALING ORDINANCE NO. 245 DEFINING AND ESTABLISHING RATES AND REGULATIONS FOR WATER AND SEWER SERVICE TO PROPERTIES AND ESTABLISHMENTS THEREIN; REQUIRING AND REGULATING CONNECTIONS TO THE WATER AND SEWER SYSTEMS; ESTABLISHING A SCHEDULE OF WATER AND SEWER RATES AND THE TERMS OF PAYMENT; AND PROVIDING PENALTIES FOR VIOLATION.

The BOROUGH COUNCIL OF THE BOROUGH OF BALLY, Berks County, Pennsylvania hereby ORDAINS:

SECTION 1. - DEFINITIONS:

As used in this Ordinance, the following terms shall have the meanings indicated, unless a different meaning clearly appears from the context:

RESIDENTIAL UNIT: A separate dwelling, apartment, room or group of rooms, used for separate dwelling purposes and equipped for the preparation of food. Hotels and Motels and Rooming Houses, with or without private baths, shall be considered residential units Institutional uses such as hospitals, churches, schools, and public buildings shall be considered to be a residential unit. The determination of the Borough of Bally as to what constitutes a separate dwelling unit shall be final.

NON-RESIDENTIAL UNIT: A separate building, group of buildings, or room, or group of rooms on a parcel of land held in single and separate ownership and used for any purpose other than as a residential unit. The determination of the Borough of Bally as to what constitutes a separate non-residential unit shall be final.

IMPROVED PREMISES: Any parcel of property upon which a residential or non-residential unit is located.

CONNECTION FEE: A fee which shall not exceed an amount based upon the actual cost of the connection of the property extending from

the Borough's main to the property line or curb stop of the property so connected.

TAPPING FEE: A fee to be paid by the owner of an improved premises, or a premises which the owner proposes to improve, which premises will be connected to the water and/or sewer system. The fee is computed as described in the "Municipalities Authorities Act of 1945" as amended.

SECTION 2. - MANDATORY CONNECTION TO WATER AND SEWER SYSTEM:

All owners of any improved premises located or to be constructed within the Borough of Bally and situated so that water service is available shall be required to connect said premises to the water system serving the Borough, owned and operated by the Borough of Bally.

All owners of any improved premises located or to be constructed within the Borough of Bally and situated so that sewer service is available shall be required to connect said premises to the sewer system serving the Borough, owned and operated by the Borough of Bally.

Where such service is temporarily not available, the Sewage Enforcement Officer shall design and enforce regulations consistent with State standards for on-site systems. At such time as water or sewer service becomes available, the owner of the improved premises shall be required to connect to the water/sewer system.

SECTION 3. - PERMIT REQUIRED FOR PRIVATE WELLS:

After the date of adoption of this Ordinance it shall be illegal for any individual, company, corporation, or other agency to drill; re-drill, or otherwise enlarge; a well within the borough limits of the Borough of Bally without first making application to and receiving a permit from the Borough of Bally. Application shall be made on a form provided by the Borough. When permitted, Private Wells shall not be connected in any way with the water distribution system, or the sewer collection system. Private wells may be utilized in the Agricultural Industry, when not connected in any way to the Borough water and/or sewer systems, for the feeding and maintenance of livestock.

The Borough Engineer shall review all applications for private wells, and the Borough may use all available expertise, both public and private, in evaluating the suitability of a proposed will in meeting the Borough's interest of protecting the health of its residents and the integrity of its public water supply sources.

The Borough shall act upon all such applications within thirty days from the date the application is submitted to the Borough. The Borough shall not unreasonably withhold the issuance of such permit, provided all other aspects of this Ordinance, and all other Ordinances and/or regulations of the Borough are met. The Borough shall not issue a

permit for a private well if, in the opinion of the Borough of the Pennsylvania Department of Environmental Protection, such well could inter-connect or otherwise adversely interfere with the ground water supplying Well No. 2 or Well No. 3, or any other water sources operated by the Borough of Bally, or have any adverse effect on the remedial action being taken for the removal of the contamination connected with those wells.

SECTION 4. - TAPPING FEE:

All owners of any improved premises required to connect to the Borough of Bally water and/or sewer systems shall pay a "tapping fee" in the amount of $3000.00 per residential unit and/or non-residential unit situated on the improved premises. This tapping fee shall be apportioned as follows: $300.00 for the water connection and $2700.00 for the sewer connection. In the case of an existing parcel of ground held in separate ownership for which an application is filed for connection to the Borough water and sewer systems, the tapping fee shall be paid at the time of application. In the case of a Subdivision or Land Development Plan, the tapping fee shall be paid to the Borough prior to the time a Subdivision or Land Development plan is given final approval by Borough Council. Payment of the tapping fee shall entitle the owner of the improved premises, and the owner's successors or assigns, to connect the commercial or industrial establishment (s) or dwelling units contemplated by the Subdivision or Land Development Plan on the improved premises to the water and sewer systems operated by the Borough of Bally.

SECTION 5. - CONNECTION FEE:

All owners of any improved premises required to connect to the Borough of Bally water/sewer system shall pay to the Borough a "connection fee" of $3000.00 for each water and sewer connection. The Borough of Bally, or its authorized representative shall provide and install the corporation tap into the water main or sewer main together with the pipe from the tap to a point not more than 18 inches on the owner's side of the right-of-way line or street curb line, terminating at and including the curb stop and box or valve. The connection fees shall be used to pay the costs of the above-described connection into the main and installation of the water and sewer laterals by the Borough. To the extent that the connection fee exceeds the actual cost of the connection, the unused portion of the connection fee will be refunded to the owner. If the cost of the connection exceeds the connection fee, the owner shall pay to the Borough the additional funds requested and shall make such payment to the Borough within 30 days of the Borough's written demand therefore.

The Borough may install the lateral from the water or sewer main onto the improved premises (as provided above) upon payment of the connection and tapping fees and at any time after the approval of the application for water and sewer service in the case of a single lot held in separate ownership, or at any time after the approval of the Subdivision or Land Development Plan in such a case; PROVIDED, HOWEVER, that the lateral shall be installed so as not to delay the

owner's occupancy of the improved premises. The Borough shall give the owner at least 15 days written notice of the time when the Borough proposes to make the connection and install the lateral. The connection fee shall be paid to the Borough within 15 days of the Borough's notice and prior to the connection being made to the water and/or sewer mains.

SECTION 6. - METERING:

A water meter shall be installed in the water lateral in a suitable protective pit directly opposite the point at which the tap is made into the water main. In the alternative, the meter may be located inside the building, if the meter is equipped with an outside remote reading device which conforms to municipal standards. Each new water meter shall be furnished by the Borough at the expense of the property owner.

The Borough shall inspect, test, adjust, maintain, and/or replace such meters at its own expense, except that any meter damaged in service through the negligent act or omission, of the property owner or his tenant or agent, shall be replaced by the Borough at the expense of the property owner. Meter damage resulting from freezing or back-flow of hot water shall be considered to be the result of negligence of the owner or tenant.

The accuracy of the water meters on the Borough system shall be determined in accordance with the Rules and Regulations of the Public Utilities Commission of the Commonwealth of Pennsylvania. Upon request of any owner, the Borough will remove the meter from the owner's premises and test the accuracy thereof. If the said meter is found to register a greater quantity of water than passed through it, to a degree exceeding the tolerance of accuracy prescribed by the Public Utility Commission for such cases, no charge shall be made for such test, and the bills for water rendered on the basis of the registration of such meter for a period of time of not more that three months preceding the removal thereof may be adjusted on an equitable basis. If said meter is found to register a smaller quantity of water than passed through it, or to be within the prescribed tolerances of accuracy, a charge equal to the costs incurred by the Borough in having the meter tested shall be paid by the owner for the testing of the meter. Upon request the owner may witness the test made during the normal business hours of the Borough.

SECTION 7. - LATERAL INSTALLATION:

A. No water and/or sewer lateral shall be covered until it has been inspected and approved by the Borough of Bally. If any part of a water and/or sewer lateral is covered before so being inspected and approved, it shall be uncovered for inspection, at the cost and expense of the owner of the improved property to be connected to the water and sewer mains.

B. Every water and/or sewer lateral of any improved property shall be maintained in a sanitary and safe operating condition by the owner of such improved property.

C. Every excavation for a water and/or sewer lateral shall be guarded adequately with barricades and lights to protect all persons from damage and injury. Any street, sidewalk or other public property disturbed in the course of installation of a water and/or sewer lateral shall be restored, at the cost and expense of the owner of the improved property being connected, in a manner satisfactory to the Borough of Bally.

D. The owner of an improved premise shall, at his expense, be responsible to repair, replace, and maintain the water and/or sewer lines on the owner's property from the point at least 18 inches on the owner's side of the street curb line or the right-of-way line where the lateral constructed by the Borough terminates.

E. If any person shall fail or shall refuse, upon receipt of a notice in writing of the Borough of Bally to remedy any unsatisfactory condition with respect to a building lateral within sixty (60) days of receipt of such notice, the Borough of Bally may refuse to permit such person to be served by the water system until such unsatisfactory condition shall have been remedied to the satisfaction of the Borough of Bally.

F. The Borough of Bally reserves the right to adopt, from time to time, additional rules and regulations it shall deem necessary and proper relating to connections with a main and with the water and sewer systems, which additional rules and regulations, to the extent appropriate, shall be and shall be construed as part of the Ordinance.

SECTION 8. - WATER CHARGES:

The Borough shall impose fees for charges to municipal water service as may be established from time to time by Resolution of the Borough upon owners of improved premises within the Borough of Bally at which a water meter or meters have been installed.

SECTION 9. - SEWER CHARGES:

The Borough shall impose fees for public sewer service as may be established from time to time by Resolution of the Borough upon owners of improved premises within the Borough of Bally at which a water meter or meters have been installed. The fees or charges for public sewer service shall be based upon metered water consumption at the improved premises.

SECTION 10. - BILLING AND PAYMENT PROCEDURES:

A. Bills for water and sewer service furnished for all purposes shall be rendered on a quarterly basis, a quarter to consist of any period of approximately ninety-one (91) days. Upon request of any owner, if an improved premises is anticipated to be vacant for any substantial period of time, the Borough of Bally will remove the water meter from

his property, discontinue water service to the property, and discontinue the minimum charges requested, the Borough will, upon payment of a re-connection charge of $100.00, reinstall the meter or a similar meter at the property and reestablish service.

B. Usage, service, and minimum charges shall be payable at the Municipal Office on a net basis at any time up until 30 days after the date of the bill. Thereafter, a late payment penalty equal to 10% of the net amount of the bill PLUS interest calculated at the rate of 10.00% per annum from 30 days after the date of the bill shall be added to the bill and shall be due and payable to the Borough. Failure to receive a bill shall not entitle an owner or user to an extension of time for payment.

C. Failure to pay the amount owed on a quarterly water and/or sewer bill by the time the next succeeding quarterly water and/or sewer bill goes into its late payment penalty period, shall be cause for termination of water service until payment is made of all outstanding charges for water and/or sewer service. PROVIDED, HOWEVER, in no case shall the water supply be shut off until ten (10) days after written notice of an intention so to do has been mailed to the person liable for payment and a written notice has been posted at a main entrance to the premises where the water supply is to be shut off. If during such ten (10) day period, the person liable for payment delivers to the Borough of Bally a written statement which states under oath or affirmation that such statement is not executed for purpose of delay and that he has a just defense to the claim for payment or to part of such claim, the water supply shall not be shut off until such claim has been judicially determined.

D. If service is terminated under the conditions set forth in paragraph C, above, a re-connection charge of $100.00 shall be paid before service is restored.

E. The owner of the property served shall be responsible to the Borough of Bally for payment for all water furnished and/or sewer services provided to the property irrespective of any agreement between the property owner and a third party, and the bill shall in all cases be rendered to the owner of the property unless the Borough of Bally is notified in writing by said owner to render the bill to some other person, and the Borough agrees to such arrangements, in which case the owner shall nevertheless remain liable for the payment of all water and/or sewer bills.

SECTION 11. - EMERGENCY CONDITIONS:

The Borough of Bally shall have the authority in the event of any emergency affecting the adequacy of the supply of water to all users of the municipal water system or the adequacy of the fire-fighting capacity of the system, either actual or imminent, to require any or all users to curtail or discontinue the use of water. Such curtailment or discontinuance shall remain in effect for the duration of such emergency. Verbal or other notice by the Borough of Bally to the user or his agent, or public advertisement in a newspaper circulated locally shall be deemed sufficient for the purposes of this ordinance.

Any such curtailment may apply to all use of water for washing the car and watering the lawn or garden, and if the degree of the emergency shall warrant, include any or all uses.

SECTION 12. - BOROUGH ACCESS:

As long as water and/or sewer services are provided to any building, the proper officials of the Borough of Bally shall at all reasonable times have free access to the meters or service pipes to inspect, test, read, repair, remove, or replace the same, whether or not the occupant of the building is a water user, and such access shall not be impeded by coal, ashes, rubbish, shrubs plantings, or other obstacles, nor in any other manner. Failure to provide such free access shall be cause for termination of service until suitable access is provided.

SECTION 13. - VIOLATION:

Except as otherwise specifically provided in Section 9, above, any person, firm or corporation who shall violate any provisions of this ordinance shall, upon conviction thereof, be sentenced to pay a fine of not more that six hundred dollars ($600.00), and in default of payment, to imprisonment for a term not to exceed thirty (30) days.

SECTION 14. - REPEALER:

Ordinance # 245 is hereby repealed in its entirety. All other Ordinances or Resolutions, or parts of Ordinance or Resolutions, which are inconsistent herewith are hereby repealed to the extent that the same are inconsistent with the terms of this Ordinance

SECTION 15. - SEVERABILITY:

If any sentence, clause, section, or part of this Ordinance is for any reason found to be unconstitutional, illegal or invalid, such unconstitutionally, illegality or invalidity shall not affect or impair any of the remaining provisions, sentences, clauses, sections or parts of this Ordinance. It is hereby declared as the intent of the Borough of Bally that this Ordinance would have been adopted had such unconstitutional, illegal or invalid sentence, clause, section or part thereof not been included herein.

SECTION 16. - EFFECTIVE DATE:

This Ordinance shall become effective on the 4th day of November , 2002.

ORDAINED and ENACTED as an Ordinance of the Borough of Bally this 4th day of November, 2002.

Ordinances & Resolutions / Officials / History / Police / Water & Sewer /
/ Taxes / News /Park / Pool / Map / Home /

Bally Borough
425 Chestnut Street
P.O. Box 217
Bally, PA 19503-0217
Telephone: 610-845-2351
Fax: 610-845-2023
Email: Bally@comcast.net

ATTACHMENT 5

TABLE 2

REMEDIATION AND DISCHARGE LIMITS
DERIVED FROM ARARS

CONTAMINANT CONCENTRATION ARARs (ppm)

MEDIUM	TCE	TCA	DCE	PCE	METHYLENE CHLORIDE	1,1-DCA	1,2-DCA
Ground Water	0.005 (MCL)(1)	0.2 (MCL)	0.007 (MCL)	0.005 (PMCL)(2)	0.005 (RSD)(3)	NE (4)	NE
Treated Ground Water	0.001 (MWS)(5)	0.2 (MWS/MCL)	0.007 (MWS/MCL)	NE	NE	NE	NE
Surface Water	0.033 (NPDES)(6)	Monitor Only (NPDES)	0.00063 (NPDES)	0.0014 (NPDES)	Monitor Only (NPDES)	Monitor Only (NPDES)	Monitor Only (NPDES)

(1) MCL - Maximum Contaminant Level

(2) PMCL - Proposed MCL

(3) RSD - Risk Specific Dose

(4) NE - None Established: These compounds have not been detected in Municipal Well No. 3

(5) MWS - Municipal Water Supply Permit

(6) NPDES - National Pollutant Discharge Elimination System Permit

ATTACHMENT 6

WELL ABANDONMENT FORM

CONTRACTOR/AGENT: Arcadis REGISTRATION NO. _____

DATE: 3.7.06 TYPE OF SITE OR PROGRAM: Adjacent to Superfund

1. WELL LOCATION: (Show sketch of location on back of this form.)

Municipality Bally Borough / Washington County Berks

Quadrangle East Greenville 5th Avenue and Walnut Street
(Road, community, subdivision, lot no.)

Latitude [redacted] Longitude [redacted]

2. OWNER AND ADDRESS: [redacted]

3. TOPOGRAPHY: (Circle) hilltop, slope, stream terrace, valley, stream channel, draw, local depression, (flat)

4. USE OF WELL: unknown

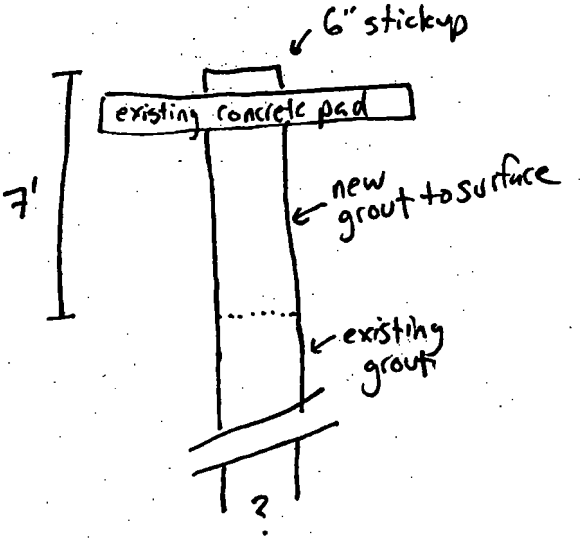
5. DEPTH OF WELL: unknown DIAMETER OF WELL: 6"

6. AMOUNT OF CASING REMOVED: n/a DIAMETER: n/a

7. SEALING MATERIAL:		neat cement	sand cement
	bags (94 lb):	1	
	gals of water:		
	yds of sand:		

OTHER MATERIAL: _____ amount: _____

WELL DIAGRAM: sketch a diagram showing depths of well, casing (if present), grouting materials, perforations, etc.



8. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

Added cement to groundsurface from existing grout (7' bgs)

9. CERTIFICATION: We hereby certify that this well abandonment record is true and exact, and was accomplished on 7th day of the month of March, 2006, with our active participation and that we are qualified to participate in such abandonment actions.

1. Signature of Participant: _____ 2. Signature of Participant: _____

Date: 3.7.06 Address: 6 Terry Dr. Suite 300 Newtown, PA 18940 Date: _____ Address: _____

private info

ARCADIS

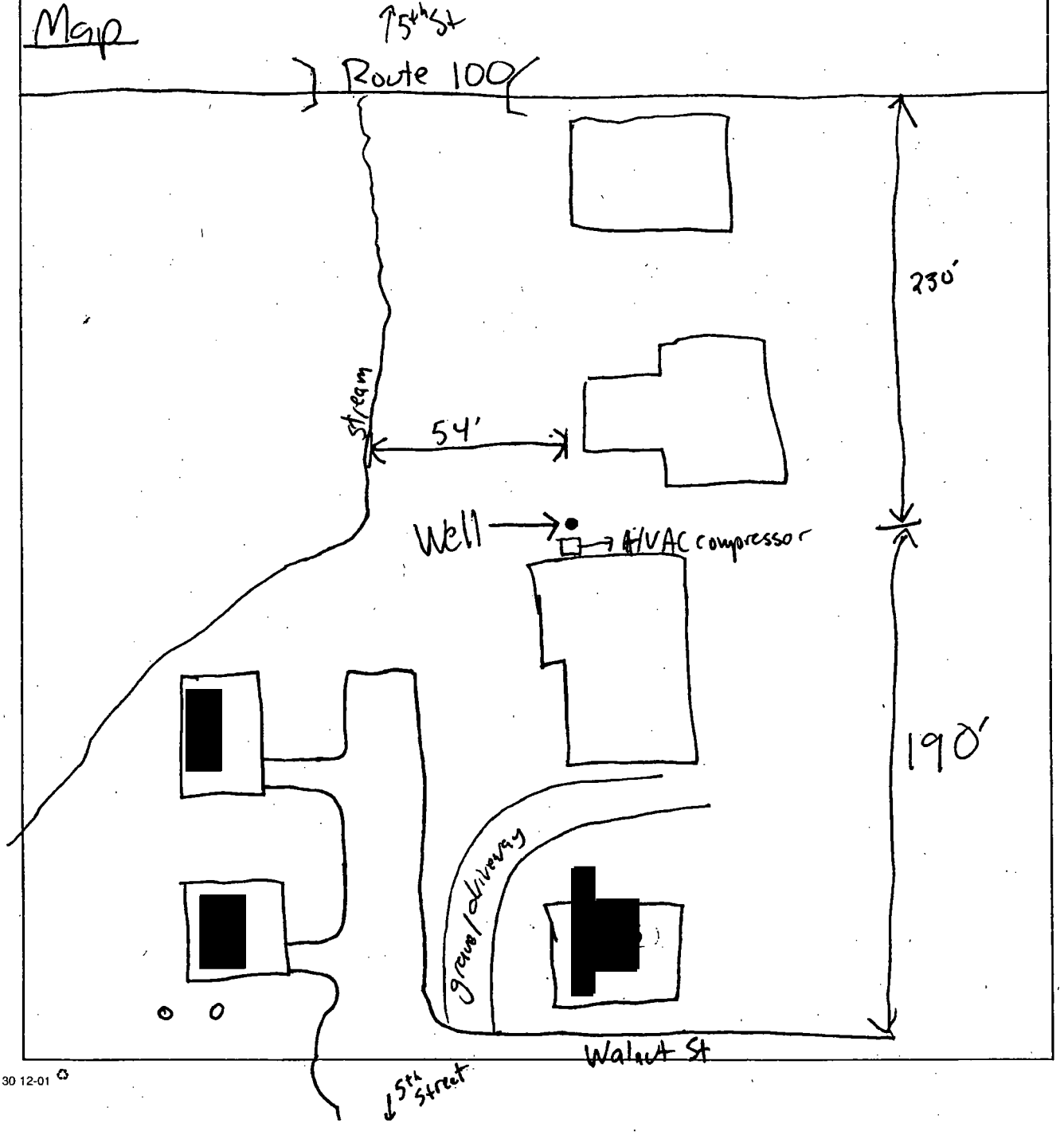
SUBJECT: Bally Well Abandonment
0705-1125
JOB NO: [redacted]

BY: ROM DATE: 3.7.06
CHKD: DATE:

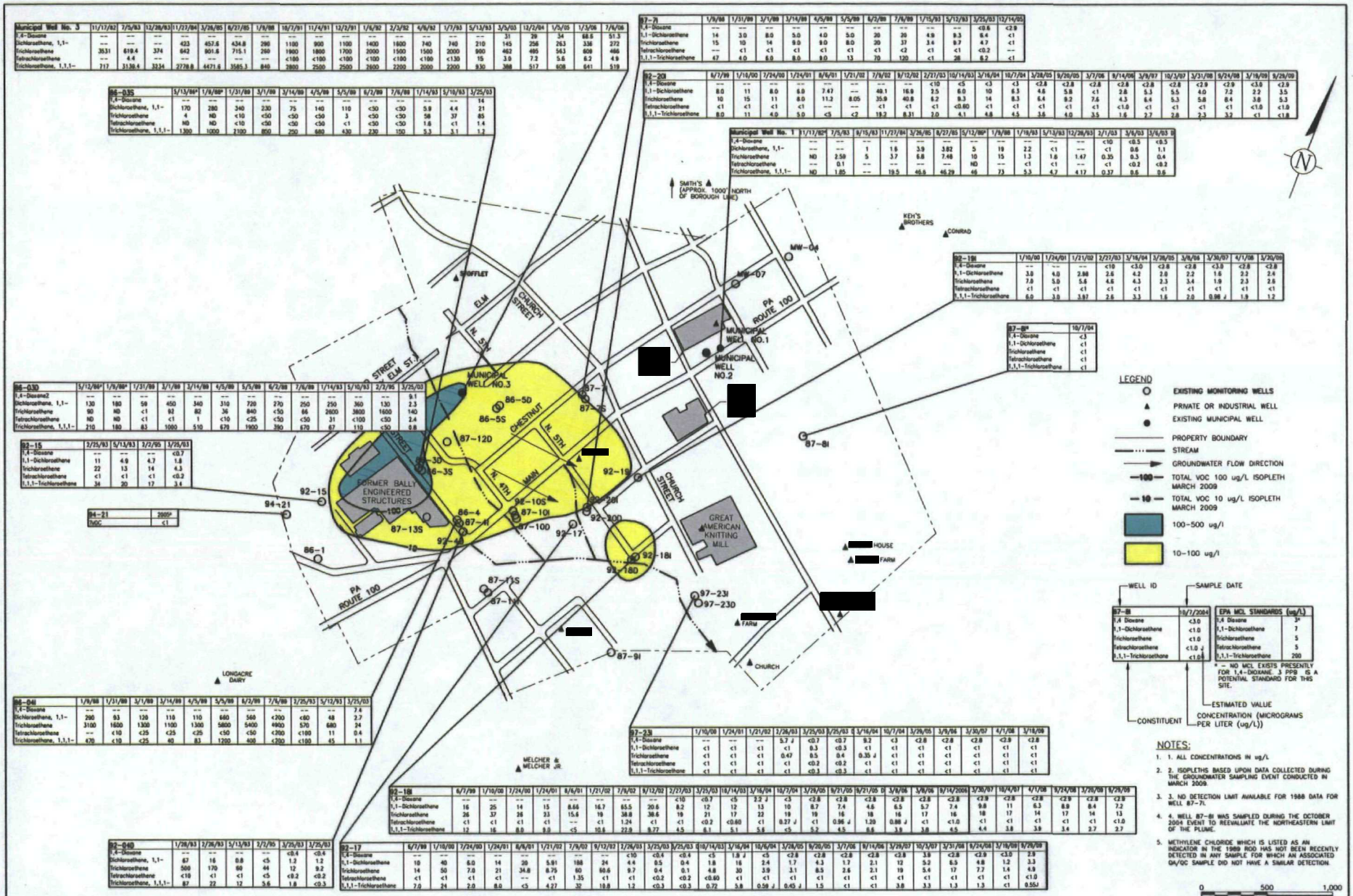
PAGE 1
SHEET 1/1

→ Well had existing grout to ~7' bgs. Added approximately 1 bag of Portland Type I cement to ground surface and took pictures.
→ Well located on [redacted] property
→ Abandonment completed via signed agreement w/ [redacted].

Map



ATTACHMENT 7



Municipal Well No. 3	11/17/82	7/5/83	12/28/83	11/27/84	3/26/85	8/27/85	1/9/88	10/7/91	11/4/91	12/2/91	1/6/92	2/3/92	4/8/92	1/7/93	5/13/93	3/3/03	12/2/04	1/3/05	1/3/06	7/6/06
1,4-Dioxane	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	31	39	34	68.6	51.3
Dichloroethene, 1,1-	---	---	---	423	457.6	434.8	290	1100	900	1100	1400	1600	740	740	210	145	256	263	336	272
Trichloroethene	3531	610.4	374	642	801.6	715.1	260	1900	1800	1700	2000	1500	1500	2000	900	462	485	563	608	466
Tetrachloroethene	---	4.4	---	---	---	---	---	<100	<100	<100	<100	<100	<100	<130	15	3.0	7.2	5.6	6.2	4.9
Trichloroethane, 1,1,1-	717	3138.4	3234	2778.8	4471.6	3585.3	840	2800	2500	2500	2600	2200	2000	2200	930	388	517	608	641	519

86-035	5/13/86*	1/9/88*	1/31/89	3/1/89	3/14/89	4/5/89	5/5/89	6/2/89	7/6/89	1/14/93	5/10/93	3/25/03
1,4-Dioxane	---	---	---	---	---	---	---	---	---	---	---	14
Dichloroethene, 1,1-	170	280	340	230	75	140	110	<50	<50	5.8	4.4	21
Trichloroethene	4	ND	<10	<50	<50	<50	3	<50	<50	58	37	85
Tetrachloroethene	ND	ND	<10	<50	<50	<50	<1	<50	<50	1.6	<1	1.4
Trichloroethane, 1,1,1-	1300	1000	2100	800	250	680	430	230	150	5.3	3.1	1.2

97-7i	1/9/08	1/31/09	3/1/89	3/14/89	4/5/89	5/5/89	6/2/89	7/6/89	1/15/93	5/12/93	3/25/03	12/14/05
1,4-Dioxane	---	---	---	---	---	---	---	---	---	---	<0.6	<2.9
1,1-Dichloroethene	14	3.0	8.0	5.0	4.0	5.0	20	20	4.9	8.3	8.4	<1
Trichloroethene	15	10	14	9.0	9.0	8.0	20	37	3.4	9.7	4.7	<1
Tetrachloroethene	---	<1	<1	<1	<1	<1	<2	<1	<1	<1	<0.2	---
1,1,1-Trichloroethane	67	4.0	8.0	8.0	9.0	13	70	120	<1	28	8.2	<1

92-20i	8/7/99	1/10/00	7/24/00	1/24/01	8/6/01	1/21/02	7/9/02	8/12/02	2/27/03	10/14/03	3/16/04	10/7/04	3/28/05	9/20/05	3/7/06	9/14/06	3/9/07	10/3/07	3/31/08	9/24/08	3/18/09	9/29/09
1,4-Dioxane	---	---	---	---	---	---	---	---	<10	<5	<3	<3	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.9	<3.0	<2.9	
1,1-Dichloroethene	8.0	11	8.0	6.0	7.47	---	48.1	16.9	2.5	6.0	10	6.3	4.6	5.8	<1	2.6	5.3	5.5	4.0	7.2	2.2	3.5
Trichloroethene	10	15	11	8.0	11.2	8.05	35.9	40.8	6.2	8.3	14	8.3	6.4	9.2	7.6	4.3	6.4	5.3	5.8	8.4	3.8	5.3
Tetrachloroethene	<1	<1	<1	<1	---	---	<1	<1	<1	<0.60	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0
1,1,1-Trichloroethane	8.0	11	4.0	5.0	<5	<2	19.2	8.31	2.0	4.1	4.8	4.5	3.6	4.0	3.5	1.6	2.7	2.8	2.3	3.2	<1	<1.0

Municipal Well No. 1	11/17/82*	7/5/83	9/15/83	11/27/84	3/26/85	8/27/85	5/12/86*	1/9/88	1/19/93	5/13/93	12/28/93	3/1/03	3/8/03	3/8/03 D
1,4-Dioxane	---	---	---	---	---	---	---	---	---	---	---	<10	<0.5	<0.5
Dichloroethene, 1,1-	---	---	1	1.6	3.9	3.82	5	19	2.2	<1	---	<1	0.6	1.1
Trichloroethene	ND	2.50	5	3.7	8.8	7.48	10	15	1.3	1.8	1.47	0.35	0.3	0.4
Tetrachloroethene	---	0.1	---	---	---	---	ND	---	<1	<1	---	<1	<0.2	<0.2
Trichloroethane, 1,1,1-	ND	1.85	---	19.5	46.6	46.29	46	73	5.3	4.7	4.17	0.37	0.6	0.6

92-19i	1/10/00	1/24/01	1/21/02	2/27/03	3/16/04	3/28/05	3/8/06	3/30/07	4/1/08	3/20/09
1,4-Dioxane	---	---	---	<10	<3.0	<2.8	<2.8	<3.0	<2.8	<2.8
1,1-Dichloroethene	3.0	4.0	2.98	2.6	4.2	2.8	2.2	1.6	3.2	2.4
Trichloroethene	7.0	5.0	5.6	4.6	4.3	2.3	3.4	1.9	2.3	2.6
Tetrachloroethene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	6.0	3.0	3.87	2.6	3.3	1.6	2.0	0.98 J	1.9	1.2

87-8i*	10/7/04
1,4-Dioxane	<3
1,1-Dichloroethene	<1
Trichloroethene	<1
Tetrachloroethene	<1
1,1,1-Trichloroethane	<1

86-030	5/12/86*	1/9/88*	1/31/89	3/1/89	3/14/89	4/5/89	5/5/89	6/2/89	7/6/89	1/14/93	5/10/93	2/3/95	3/25/03
1,4-Dioxane2	---	---	---	---	---	---	---	---	---	---	---	---	9.1
Dichloroethene, 1,1-	130	180	58	450	340	310	720	270	250	250	360	130	2.3
Trichloroethene	90	ND	<1	92	82	36	840	<50	86	2820	3800	1600	140
Tetrachloroethene	ND	ND	<1	<1	1	<10	<25	<50	<50	31	<100	<50	2.4
Trichloroethane, 1,1,1-	210	180	83	1000	510	670	1900	390	670	67	110	<50	0.8

92-15	2/25/93	5/13/93	2/2/95	3/25/03
1,4-Dioxane	---	---	---	<0.7
1,1-Dichloroethene	11	4.9	4.7	1.8
Trichloroethene	22	13	14	4.3
Tetrachloroethene	<1	<1	<1	<0.2
1,1,1-Trichloroethane	34	20	17	3.4

94-21	2005*
DGC	<1

97-23i	1/10/08	1/24/01	1/21/02	2/26/03	3/25/03	3/25/03 D	3/16/04	10/7/04	3/28/05	3/8/06	3/30/07	4/1/08	3/18/09
1,4-Dioxane	---	---	---	5.7 J	<0.7	<0.7	9.2	<3	<2.8	<2.8	<2.8	<2.9	<2.8
1,1-Dichloroethene	<1	<1	<1	<1	0.3	<0.3	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	<1	<1	<1	<1	0.47	0.5	0.4	0.35 J	<1	<1	<1	<1	<1
Tetrachloroethene	<1	<1	<1	<1	<0.2	<0.2	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	<1	<1	<1	<1	<0.3	<0.3	<1	<1	<1	<1	<1	<1	<1

86-04i	1/9/88	1/31/89	3/1/89	3/14/89	4/5/89	5/5/89	6/2/89	7/6/89	2/25/93	5/12/93	3/25/03
1,4-Dioxane	---	---	---	---	---	---	---	---	---	---	7.4
Dichloroethene, 1,1-	290	93	120	110	110	640	560	<200	<80	48	2.7
Trichloroethene	3100	1600	1300	1100	1300	5800	5400	4900	570	680	24
Tetrachloroethene	---	<10	<25	<25	<25	<50	<50	<200	<100	11	0.4
Trichloroethane, 1,1,1-	470	<10	<25	40	83	1200	400	<200	<100	45	1.1

92-18i	6/7/99	1/10/00	7/24/00	1/24/01	8/6/01	1/21/02	7/9/02	8/12/02	2/27/03	3/25/03	10/14/03	3/16/04	10/6/04	3/28/05	9/21/05	9/21/05 D	3/8/06	3/8/06	9/14/2006	3/30/07	10/4/07	4/1/08	9/24/08	3/20/09	9/29/09
1,4-Dioxane	---	---	---	---	---	---	---	---	<10	<0.7	<5	2.2 J	<3	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.9	<2.8	<2.9	<2.8	<2.9	
1,1-Dichloroethene	16	25	14	15	8.66	16.7	85.5	20.6	8.2	12	12	13	10	8.7	7.4	4.6	6.5	5.7	7.4	9.8	11	6.3	8.8	8.4	7.2
Trichloroethene	26	37	26	33	15.6	19	38.8	38.6	19	21	17	22	19	19	16	18	16	17	16	18	17	14	17	14	13
Tetrachloroethene	<1	<1	<1	<1	---	<1	1.24	<1	<1	<0.2	<0.60	<1	0.27 J	<1	0.96 J	1.20	0.88 J	<1	<1.0	<1	<1	<1	<1	<1	<1.0
1,1,1-Trichloroethane	12	16	8.0	8.0	<5	10.8	22.9	9.77	4.5	8.1	5.1	5.8	<5	5.2	4.5	4.5	3.8	3.8	4.5	4.4	3.8	3.9	3.4	2.7	2.7

92-04i	1/28/83	2/26/83	5/13/83	2/2/95	3/25/03	3/25/03
1,4-Dioxane	---	---	---	---	<0.4	<0.4
Dichloroethene, 1,1-	67	16	8.8	<5	1.2	1.2
Trichloroethene	14	50	7.0	21	34.8	8.75
Tetrachloroethene	<1	<1	<1	<5	<0.2	<0.2
Trichloroethane, 1,1,1-	87	22	12	5.6	1.8	<0.3

92-17i	6/7/99	1/10/00	7/24/00	1/24/01	8/6/01	1/21/02	7/9/02	8/12/02	2/26/03	3/25/03	3/25/03 D	10/14/03	3/16/04	10/6/04	3/28/05	9/20/05	3/7/06	9/14/06	3/29/07	10/3/07	3/31/08	9/24/08	3/18/09	9/29/09
1,4-Dioxane	---	---	---	---	---	---	---	---	<10	<0.4	<0.4	<5	1.8 J	<5	<2.8	<2.8	<2.8	<2.8	<2.8	3.0	<2.8	<2.9	<3.0	2.9
1,1-Dichloroethene	10	40	8.0	14	30	5.91	188	24	4.4	0.5	0.4	1.8	16	2.4	1.7	4.3	1.7	2.1	12	5.2	6.5	4.8	1.2	3.3
Trichloroethene	14	50	7.0	21	34.8	8.75	60	60.6	9.7	0.4	0.1	4.8	30	3.9	3.1	8.5	2.6	2.1	19	5.4	17	7.7	1.4	4.9
Tetrachloroethene	<1	<1	<1	<1	---	<1	1.35	<1	<1	<0.2	<0.2	<0.60	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.0	
1,1,1-Trichloroethane	7.0	24	2.0	8.0	<5	4.27	32	10.8	1.2	<0.3	<0.3	0.72	5.8	0.58 J	0.45 J	1.5	<1	<1	3.8	3.3	1.3	1.3	<1	0.55J	

NOTES:

1. 1. ALL CONCENTRATIONS IN ug/L
2. 2. ISOPLETHS BASED UPON DATA COLLECTED DURING THE GROUNDWATER SAMPLING EVENT CONDUCTED IN MARCH 2009.
3. 3. NO DETECTION LIMIT AVAILABLE FOR 1988 DATA FOR WELL 87-7i.
4. 4. WELL 87-8i WAS SAMPLED DURING THE OCTOBER 2004 EVENT TO REEVALUATE THE NORTHEASTERN LIMIT OF THE PLUME.
5. 5. METHYLENE CHLORIDE WHICH IS LISTED AS AN INDICATOR IN THE 1989 ROD HAS NOT BEEN RECENTLY DETECTED IN ANY SAMPLE FOR WHICH AN ASSOCIATED QA/QC SAMPLE DID NOT HAVE A SIMILAR DETECTION.

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BALLY GROUNDWATER SITE

GROUNDWATER SAMPLING RESULTS 1988 TO 2009

BALLY, PA

Project Number: NP000597.002
Date: 9 JANUARY 2007
Figure: 3